Railway Age

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An Increase in Railway Mileage

AN interesting and significant fact disclosed by the annual report of the Interstate Commerce Commission, recently made public, is that in 1925, for the first time in nine years, the total railway mileage in the United States increased instead of declining. Statistics for 1926 which are being compiled for the *Railway Age* indicate that probably the same thing has occurred this year. There are two kinds of railway mileage—"mileage owned" and "mileage operated," the latter being larger than the former because some lines are operated under trackage rights by two or more railways. The true test of whether more miles are being built than torn up by the railways as a whole is the change that occurs in any year in total "mileage owned," which for 1925 has only now become available. "Mileage owned" reached its maximum on June 30, 1916, when it was 254,251. It declined 214 miles in the latter half of 1916; 411 miles in the year 1917; 97 miles in 1918; 377 miles in 1919; 307 miles in 1920; 1,669 miles in 1921; 763 miles in 1922; 191 miles in 1923; and 66 miles in 1924,—a total decline of 4,095 miles. It increased 412 miles in 1925, or to 250,568 miles. The figures reflect the changes that have been occurring in the traffic, earnings and financial condition of the railways. The largest declines occurred in 1921 and 1922, when the percentage of net return earned averaged less than in any other two years in history. When a complete check of the mileage by states in 1925 can be made it will undoubtedly be found that most of the increases have occurred in the South, where recent increases in traffic and earnings have been relatively the largest.

Watch Overhead Clearances

THE restoration of an uneven track surface to a uniform grade is carried out of necessity by raising the low spots, but to do this on a practical basis in a general resurfacing it is necessary to raise the entire track. In spite of the fact that the repeated raising of track involves the application of large quantities of ballast, the action of traffic is to depress the track to approximately its original surface but repeated resurfacing does tend to bring about a gradual permanent increase in the track level. This tendency has to be watched carefully in cities where tracks are crossed by paved streets at grade and is becoming a problem of increasing importance in the open country because of the growing number of grade crossings with paved highways. Of more serious consequence is the effect of an increase in the elevation of track at places where this results in a decrease in the headroom over the tracks as in tunnels or under overhead bridges. A study of this problem in connection with a track depression project now in progress has led to the conclusion that the time to avoid excessive elevation in track is during construction. If the track were brought to full elevation at once it would be possible that an unevenness in track surface developed during the early seasoning period would necessitate heavy resurfacing with a consequent encroachment on the vertical clearance under street viaducts. To avoid this the roadbed was taken out lower than necessary for the standard depth of ballast and the tracks ballasted and surfaced to a grade somewhat below that established, with the idea that subsequent surfacing would eventually raise the track to the grade determined upon.

Supplying the Urge

A MEMBER of the *Railway Age* editorial staff recently visited railroad repair shops in nineteen cities on a 6,000-mile round trip from Chicago to the Pacific coast and return. On this trip he observed a car shop, located not far from Denver, Colo., which stood out noticeably for the earnestness with which the shop men went about their work of rebuilding both wooden and steel cars. While no undue haste was apparent, every man seemed to be moving with a definite goal in view and an equally definite intention to reach it. Men standing around idle were notable for their absence. Subsequent inquiry developed that the reason for this somewhat unusual activity in a car shop, entirely aside from appreciation for a fine, modern, well-equipped shop and good working conditions, is a production system of wage payment whereby each man who fails to earn at least six per cent above the standard day rate for his particular class of work is shifted to another job to which he is better suited. It is said that at this shop one man working on the fabrication of steel cars drives 1,300 three-quarter in. rivets in eigth hours. The uniform system of daily wage payment so commonly used in most railroad mechanical departments doubtless has some merits, but its adverse effect on individual initiative and effort cannot be denied.

Accident Prevention Requires Consistent Effort

THE award of the E. H. Harriman medals for the most conspicuous accident prevention work by the railways in America during 1925 is important because it pays tribute where tribute is due, but more important because it points out what consistent effort and attention will do to reduce railway accidents. The Union Pacific, which received the gold medal, operated in 1925 more than 53,000,000 locomotive-miles and more than 1,000,000,000 passenger-miles. Only 24 employees were killed in train and train service accidents and only 5 in non-train accidents, including shop accidents of all kinds. Only 407 employees were injured in non-train accidents during 105,000,000 man-hours of work. The silver replica

was awarded to the Duluth, Missabe & Northern for its record of no passengers or employees killed in either train or train service accidents during 1925, in spite of an exposure of 1,830,000 locomotive-miles and 6,000,000 man-hours of work in its shops. The bronze replica was awarded to the Green Bay & Western, which went through the entire year without a fatality from any cause and with accidental injuries to only one employee and to four other persons in either train or train service accidents. Such records have not just happened. They have been made through constant work for accident prevention, work which has taken many forms. They have not been made through occasional campaigns which stimulate interest among the employees in accident prevention only to permit it to subside through lack of sustained interest. Rather, the records of these three prize-winning roads are the culmination of years of consistent and unflagging work for accident prevention. The Union Pacific this year wins the gold medal for the second consecutive time. Furthermore, the Duluth, Missabe & Northern, it was pointed out in the award, has operated during the last three years without a single death and without the loss of an arm, hand, eye, leg or foot to any employee or passenger, which, as the committee said, is a "truly remarkable record." One of the car repair shops of this road, where approximately 2,000 cars are repaired each month, has not had an injury causing the loss of even one day's time in more than eight years. Accident prevention is worth while, and it can be accomplished only by being made a part of the daily duties of every officer and employee.

Justice and Wages

COMMENTING in the paper "Labor" upon the recent award of a 7½ per cent advance in wages to the conductors and trainmen of eastern railways, O. F. Sheppard, president of the Order of Railway Conductors, says:

> "For once, conductors' wages are not fixed on the cost of living. I have argued for years that the compensation of conductors should be based on the duties and requirements of the position. In the eastern case, the board of arbitration was requested to take into consideration the human elements and to apply justice without regard to freight and passenger rates or the profits made by the carriers."

Mr. Sheppard's statement seems to show he agrees with the view expressed in the *Railway Age* last week that the arbitration board did virtually disregard cost of living, railway rates and railway profits, and he says he is "delighted with the award."

As this paper repeatedly has pointed out, there are three parties that are directly concerned with railway operation—the employees, investors in railway securities and the public. It would be interesting to have Mr. Sheppard explain how wages could be fixed in accordance with the principles he states. His principles seem to be in irreconcilable conflict with each other.

How can "human elements" be considered and cost of living be disregarded? The necessary cost of living of one human family is as much as that of another human family of the same size. Therefore, on the basis of "human elements" the wages of all classes of railway employees should be the same. But Mr. Sheppard does not stick to "human elements." He contends that "the compensation of conductors should be based on the duties and requirements of the position," and no doubt he believes that—regardless of "human elements"—it should be much higher than the compensation of a track laborer. It is for the very reason he gives that the salary of a general manager is higher than that of a conductor and the salary of a president higher than that of a general manager. Nevertheless, the so-called "fancy salaries" of railway officers often have been criticized by labor union leaders. Regardless of the merits of the recent award, we agree that the compensation of conductors, and of other employees also, should be based on the "duties and requirements of the position," but if, this is sound doctrine regarding the pay of conductors, it is obviously also sound doctrine regarding the pay of officers.

One vital question Mr. Sheppard's statement raises is as to how a board arbitrating a railway wage dispute could "apply justice without regard to freight and passenger rates and the profits made by the carriers." Justice is a relative term. Until Robinson Crusoe acquired his man Friday he was alone on his island and could do neither justice nor injustice to anybody. What is just is a question that arises only in a society consisting of two or more persons. As used by Mr. Sheppard, the word "justice" relates to the economic problem of dividing fairly the product of industry between the different classes concerned in production.

The investors in securities provide the management and physical plant of the railways. The employees furnish what is called the "labor," which consists partly of effort with their brains and partly of effort with their hands. The public furnishes the traffic handled and pays the bills. Without either of these factors railroad transportation would never have begun and would soon stop. Could rates and financial return be determined justly without regard to wages? Obviously not. Then how could wages be so fixed as "to apply justice without regard to freight and passenger rates or the profits made by the carriers?"

Mr. Sheppard has given the very definition, not of justice, but of injustice, as applied to the railroad industry. To do injustice in this industry is to regulate either of the three factors of wages, rates of financial returns without regard to the other two factors. That is also the best way in the long run to so regulate as to do harm to all concerned.

There is no antagonism between justice and sound economic principles. Wages in the railroad industry should be relatively as high as in other industries, and should be graduated in proportion to the "duties and requirements" imposed upon different classes of employees and officers. If they are made higher than this they will have to be paid directly or indirectly by persons in other industries whose incomes will be less in proportion. Profits in the railroad industry should be made high enough to attract capital adequate for providing sufficient transportation service and effecting all practicable increases in efficiency. They must be made this high in the public interest; they should not be higher because they would then impose an unfair burden on railway employees, the public or both. Rates should be made high enough to enable the railways to pay reasonable wages, interest and dividends. But those who pay them should not be required to carry any heavier burden than is necessary for this purpose.

Mr. Sheppard's theory of "justice without regard to freight and passenger rates or the profits made by the carriers," if he means just what he says, puts him in a class with the man in the old story who had been arrested and arraigned in court. "My man," said the judge, "I will see that you get justice." "Bedad, Jedge," replied the man, "that's the very thing I don't want."

Significant Decisions Regarding Valuation

SOME recent decisions of the Supreme Court of the United States in public utility cases indicate clearly that the court will not uphold the principles that the Interstate Commerce Commission has been applying in making valuations of railroads, or approve the valuations that have resulted from their application. They also seem to indicate that in a case directly presenting the question the court would not sustain the commission's ruling that 5¾ per cent is a fair return for railways.

One of the cases in which the court has rendered a very significant opinion is that involving the valuation of the Indianapolis Water Company. There was definitely presented the question as to the weight that should be given to original cost of construction, cost of reproduction and going value.

The court said that reasonable cost is good evidence of value at the time of construction, "and such actual cost will continue fairly well to measure the amount to be attributed to the physical elements of the property so long as there is no change in the level of applicable prices," but that "if the tendency or trend of prices is not definitely upward or downward, and it does not appear probable there will be a substantial change of prices, then the present value of land plus the present cost of constructing the plant, less depreciation, if any, is a fair measure of the value of the physical elements of the property." It rejected a valuation based on average wages of labor and prices of materials in the ten-year period ending December 31, 1921, and accepted one based upon wages and prices of January 1, 1924, which was substantially higher. The railroad valuations thus far made have been based mainly on the average wages and prices of 1914 and 1915. The unit costs used are much lower relatively than those rejected in the waterworks' case, and must, therefore, prove proportionately less acceptable to the court.

The Interstate Commerce Commission has virtually refused to recognize going value. The Supreme Court again enunciated the principle that going value "is a property right, and should be considered a determining the value of the property."

The Interstate Commerce Commission has held that a fair return for the railways is an average of 5¾ per cent. The court expressly held that "a reasonable rate of return is not less than 7 per cent."

The problem of regulating the rates of a public utility is much less complicated and perplexing than that of regulating the rates of the railways. A public utility usually is a monopoly rendering only one kind of service, and once its valuation is made the rates required to produce a fair return can easily be arrived at. Every railway is subject to competition from other railways and other means of transportation. The valuation of a railroad must, legally speaking, be made in the same way and on the same principles as that of a public utility. The perplexing problems arise when it becomes necessary to base rates upon the valuations of railways having widely different valuations. Should the rates be based on the railway requiring the lowest rates to enable it to earn a fair return on its valuation, or on the railway requiring the highest rates to enable it to earn a fair return on its valuation, or on neither?

This important question has never been directly answered by the Supreme Court. It has been answered by Congress as far as it can answer it by provisions of the Transportation Act directing rates to be so regulated as to enable all the railways of each large group to earn a fair return upon their aggregate valuation. Under this policy some roads of a group will necessarily earn less, and some more, than a fair return upon their respective valuations. But the average for all of them will be what would be a fair return for either of them.

There can be no doubt that the application to the railways of the principles of valuation and fair return upheld by the Supreme Court in recent public utility cases would result in the railways being given larger valuations than the commission has been giving them and in larger percentages of return being allowed to be earned by them. There are, however, questions of policy as well as of law to be considered. What would be the effects upon the movement of traffic and the development of the country of the fixing of rates based upon a much higher valuation? What would be the effect upon the sentiment of the public with reference, for example, to the question of private versus government ownership?

It seems clear from the decisions of the Supreme Court that the railways under present regulation are not getting the net return to which they are constitutionally entitled. As the government has insisted upon making a valuation of them, they should stand fast for a constitutional valuation. What practical use it can or should be put to after it has been made can be determined then. Partly owing to competition among themselves and from waterways and highways, the railways never have, and probably as a matter of policy never will, seek rates higher than necessary to enable them to improve and enlarge their properties as the public interest requires.

The Depreciation Order

PROBABLY few of those who have studied the Interstate Commerce Commission's order in the depreciation case (see *Railway Age* of December 11, page 1164) have made up their minds as to exactly where the commission's findings are going to lead. It is admitted that the decision is far-reaching. There are some who fear that the financial position of certain roads may be affected adversely by the effect on their earnings statements of increased charges to operating expenses for depreciation and the setting up of depreciation reserves from surplus. Other authorities will be curious to learn whether the commission can reconcile its order with the United States Supreme Court decision in the Indianapolis Water case where the expression is used "less depreciation, if any." There is much curiosity also as to how the provisions of the order are to be carried out, notably with reference to depreciation of rail, ties, ballast, etc., in connection with which it will be difficult to determine what constitutes a unit for retirement and replacement.

The complexities of the accounting phases of the order are going to give the railway accounting officers one of the busiest years they have ever had. Those who have read the commission's decision will have noted several statements that this or that particular matter is to be left for further discussion between the I. C. C. Bureau of Accounts and the accounting associations of the carriers. The Railway Accounting Officers Association, moving with its usual dispatch in such matters, has already appointed a subcommittee of its committee on general accounts to take up this matter. The subcommittee consists of E. M. Thomas, comptroller of the Chesapeake

& Ohio; E. H. Kemper, comptroller of the Southern, and C. E. Hildum, vice-president of the Lehigh Valley. All three are railway accounting officers of high standing in the profession and leaders in the activity of the association, which indicates the importance the latter gives to the problems involved.

The committee's greatest task in its conferences with the Bureau of Accounts will no doubt be to assist in working out methods of making the depreciation order effective without undue accounting expense. It will have the great advantage that, as a result of the progress made during the last several months on the proposed revisions of the accounting classifications, the relations of the Bureau of Accounts and the Railway Accounting Officers Association are most harmonious. The accounting officers seem on the whole to be in about the closest and most friendly contact with the commission of any railroad department which, of course, is an important asset in discussing such a complicated matter as depreciation accounting.

The Western Trunk Line Rate Case

WITH the first hearing set for early in January, the Interstate Commerce Commission is about to embark upon a general investigation of Western Trunk Line territory class rates. The adjustment of class rates in that part of the country has variously been called a "low spot," a "sink hole," and a "jumble," and the need for readjustment has grown more apparent with the increasing difficulty of settling, in a satisfactory manner, cases involving class rates between Indiana and the Twin Cities, the Missouri river and points to the east, or intra-territorial points. And in this proceeding, just as in the Western advance rate case, the need of the carriers for more revenue is clearly a factor of importance to be considered in the readjustment. In the earlier case, their application for a 5 per cent increase in freight rates, if granted, would have returned additional revenue to railroads in the West to the amount of about $80,000,000. while the proposed increase in class rates would benefit the trunk line carriers alone by more than $11,500,000. Yet the opportunity of gaining that much more income is, as the *Railway Age* has pointed out (September 11, page 447), another chance for the railroads in the west to approach in some degree the 5¼ per cent return on their investment which they have not yet, as a whole, even with improving conditions, been able to earn.

The necessity for some readjustment is apparent, but, in the minds of railroad and shippers' traffic representatives, the obvious need for something to be done has been offset by the reluctance to enter upon a formal proceeding whose length would seem interminable. They have too clearly before them the Southwestern case and the Eastern class rates investigation—to mention two comparatively recent examples—that have run through several years and are not yet wholly complete. At a conference in Chicago, September 10, held to consider means of handling the investigation, there was a clear expression of this reluctance to begin a proceeding that might last "anywhere from two to six years." It was true that persons expressing this view were favorable to continuing the conferences, between a railroad committee of traffic officers and a shippers' steering committee appointed at a mass meeting of shippers in Western Trunk Line territory over two years ago, held regularly during the two years in an effort to reach some compromise between the scale of rates the carriers proposed for application and the scale of rates the shippers desired. Representatives of the two bodies reported at the Chicago conference that they believed they would be able to reach an agreement within from sixty to ninety days. In favoring the continuance of the shipper-carrier conferences, those persons who did so were primarily interested, it would seem, in conserving as much time as possible, so that benefits of a readjustment might not be lost, nor conditions outworn while a formal procedure went on for a period of years.

However, the commission has been just as aware of the disadvantages of holding another long drawn-out general investigation. In considering the case in Western Trunk Line territory, it has taken cognizance of the manner in which time was unavoidably wasted in the past, and has announced a plan whereby testimony, beginning Janury 11, 1927, shall be divided, condensed, and presented in behalf of the carriers' proposals as completely as possible at the first hearing, after which a three weeks' recess will be taken when interested parties will be able to study the proposals and to prepare themselves to appear at the next hearing with an expression of their views in as concise and ordered a manner as possible. As for the conferences between the carriers' and shippers' committees, the commission has said that the investigation in no way hinders their continuation, and, further, that any "reasonably complete agreement" resulting from these conferences will be given consideration when reported to the commission.

Improving the Quality of Employees' Magazines

ROUGHLY, the mission of a railroad employees' magazine is to promote better understandings and more friendly relations between all of the employees of a railroad and between the workers and the management. Incidentally, the extent to which it succeeds in these respects is reflected in improved service to and better relations with the public. A railroad extends in a thin line over such great distances and has so many departments, that a considerable number of faithful and inspired correspondents are necessary to make the magazine as comprehensive and effective as it should be. What can be done to train these correspondents and keep them enthusiastically on the job?

The Chesapeake & Ohio Employees' Magazine has achieved a large measure of success through a simple device. Twice a year a group of about 125 associate editors and correspondents meet for two days at a resort hotel—the last meeting was held at While Sulphur Springs, W. Va. The mornings are given over to business sessions. On the first day, for instance, there was a discussion of the aims and benefits of the magazine. President Harahan also spoke at length on his observations of the magazine and its work, and there was an address on what the railway employees' magazine can do to advance public relations. On the second morning there was a series of short presentations and discussions of various details relating to the quality and effectiveness of the magazine. The afternoons on both days were used for recreation purposes—it was interesting, however, to note the number of small and rather intensive informal discussion groups at luncheon and on the grounds during the afternoon. On the first evening of the conference there was a formal dinner, the address being made by Governor Gore of West Virginia, after

which there was a railroad moving picture and dancing. A similar program was followed on the second evening, except that the formal dinner was dispensed with.

Such meetings provide a splendid means for getting the associate editors and correspondents thoroughly acquainted with each other and fully informed as to the aims and purposes of the magazine, as well as the part that each one of them may have in making it more effective. It is difficult for the correspondents, scattered over a large system, to get the right degree of inspiration and knowledge, unless something of this sort is done. Moreover, since the work of the correspondents is all on a volunteer basis, the privilege of attending the bi-yearly meetings affords a certain degree of compensation. These meetings are said to be a large factor in the marked progress which has been made in recent years in developing and improving the quality of the magazine.

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

Balancing Factors in the Use and Obligations Covering Ownership of Freight-Train Cars, by L. K. Sillcox. Paper at annual meeting, American Society of Mechanical Engineers, discussing development of railroad equipment to date and considerations necessary to effective future expansion and operation. Abstracts of this paper were published in the *Railway Age* of December 4, 1926. 35 p. Pub. by American Society of Mechanical Engineers, New York City.

A History of Minnesota, Vol. III, by William Watts Folwell. Covers period 1865-1925, including the granger movement in Minnesota, and the history of Minnesota railroads during this period. See Index under "Railroads." Cartoon illustrating anti-railroad-consolidation movement 1901, on p. 260. 605 p. Pub. by Minnesota Historical Society, St. Paul, Minn.

The Industrial Traffic Manager. Bulletin no. 4 in Business Organization Series, discussing functions of traffic managers, information they require, value to company and place in organization. 32 p. Pub. by Policyholders' Service Bureau, Metropolitan Life Insurance Co., New York City. Apply.

Political and Industrial Democracy, 1776-1926, by W. Jett Lauck. In his chapter, "Outstanding and representative attempts towards employee representation and industrial democracy," the author considers the Pennsylvania Railroad Plan, p. 162-168, the Southern Railway Plan, p. 170-171, and the Baltimore & Ohio Plan, p. 171-173. Further discussion of other railroad plans, p. 267, 282, 307-309. 374 p. Pub. by Funk & Wagnalls, New York City. $2.

Wholesale Prices 1890-1925. Bulletin of the U.S. Bureau of Labor Statistics No. 415. 255 p. Pub. by Govt. Print. Off., Washington, D. C. 30 cents.

Periodical Articles

Fluctuating Freight Rates. Editorial comment on a proposal to help cotton growers. Barron's, December 6, 1926, p. 13.

The Nord Railway of France, Pre-War and Post-War, by Raymond Carpmael. An illustrated article containing information on yards, housing, stations and other structures, ash-handling plants, ferro-concrete ties of the present, with brief comment on pre-war and war operations. Proceedings of the Great Western Railway (London) Lecture and Debating Society, Session 1926-27, No. 195.

An Unknown Railroad Croesus, by Vincent Guy Sanborn. Arthur Curtiss James, "country's largest individual railroad investor." Magazine of Wall Street, December 4, 1926, p. 214-215.

Waterways in Livestock and Meat Trade, by Rudolf A. Clemen. History of livestock transportation before the railroads. Map, p. 641. American Economic Review, December 1926, p. 640-653.

Letters to the Editor

[*The* RAILWAY AGE *welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about* 250 *words—are particularly appreciated. The editors do not hold themselves responsible for facts or opinions expressed.*]

Buying on Specifications

CHICAGO.

TO THE EDITOR:

The article by George L. Baxter in the *Railway Age* of November 13, 1926, is an interesting analysis of a most important subject. The policy which involves the purchase of materials and supplies upon specification is justified to some extent, but only to the extent described by Mr. Baxter. The danger lies in the local and varied translation of the following precept which is advanced by Mr. Baxter: "Railroads should not, however, be in too great a hurry to eliminate an old specification before drawing up a new one, because there are features, the merits of which may need time and study to determine."

Specifications developed by the technical talent of a railroad are usually based upon the state of development in the art at the time. In all history, progress beyond this stage has been accomplished chiefly by those who do not owe allegiance to any single railway organization. Too often, therefore, when a specification is adopted it means a temporary standstill in development, or worse; it may, and frequently does, mean a backward step, the length and importance of which depends upon the alertness of those who drew the specification.

I have in mind a specification drawn by a railway for material used for locomotive operation. The manufacturers of this material were, and still are, progressing by research work and experimentation in the improvement of the material in question. Adherence to the specification involved a step backward of more than two years. It also involved the necessity for suspension, insofar as that railway was concerned, of all effort toward increased economy and advancement. Those who drew that specification could not have had any but a superficial knowledge of the subject. They unintentionally stopped progress so far as the purchase and use of the material by their own railway was concerned.

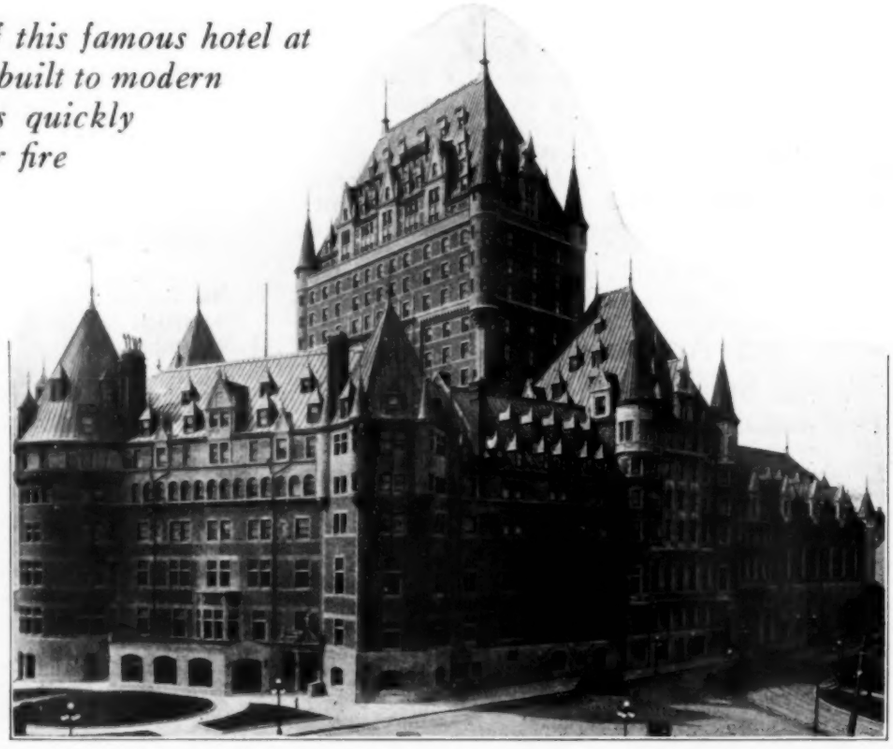
The instance recited is only one of frequent occurrences. It shows that great care should be used in the application of the specification principle and in recognizing the value of properly and carefully applied specifications; it seems to me that technical argument should be cautionary rather than promotive. Otherwise deplorable results may be registered.

Mr. Baxter's statement strikes a responsive chord among those who believe in comprehensive specifications. It seems to me, however, to uncover the extreme weakness of the plan. He encourages delay, and thus implies a discouragement of progress. Any person who has had anything to do with the struggle necessary to obtain a change in a railway specification, no matter how meritorious the reasons for change may be, knows of the tremendous inertia blocking his path.

L. F. WILSON.
Vice-president, the Bird-Archer Company.

Canadian Pacific Restores Chateau Frontenac in 127 Days

Damaged portion of this famous hotel at Quebec was rebuilt to modern standards quickly after fire



The Chateau Frontenac Restored—The Reconstructed Wing Is in the Left Foreground

IN 127 days after a fire had destroyed the greater part of the original river wing of the Canadian Pacific's Chateau Frontenac hotel at Quebec, this entire wing and another section which had suffered severe damage from water, were entirely rebuilt and restored to service. The portion of the hotel rebuilt has a cubical content of 1,250,000 cu. ft., contains 197 bedrooms with baths, a lounge, library, writing rooms, coffee shop and cafe tavern, all reconstruction being carried out according to standard fireproof practice with high grade finish and thoroughly modern appointments. This record was possible only because of careful planning and rigid adherence to a thoroughly perfected schedule of material deliveries and construction procedure.

This fire, which occurred on January 14, 1926, was confined to the original river wing which was constructed with brick and stone exterior walls. The ground and first floors were of fireproof steel and hollow tile construction, with interior partitions of wood. The upper stories had wood joists and floors, wood partitions and roof. The roof covering was copper. The fire started in the roof and worked its way down through the wood floors and burned itself out at the first floor level, which was of fireproof construction.

After the Fire—The Walls of the Wing in the Foreground Were Covered With Ice

The kitchens, the power plant and the greater part of the public space in the hotel, were not affected by the fire, and owing to the peculiar shape of the building it was possible to block off the sections which had been damaged or destroyed by fire and continue the operation of the remaining portion of the hotel without serious inconvenience. The urgent necessity was to restore the damaged portions in order that the added bedroom capacity would be available by the opening of the summer tourist season.

Rebuild in Fireproof Construction

After the debris in the burned wing had been cleared away, an examination of the exterior walls and fireproof floors disclosed but slight damage. It was therefore decided to use these in rebuilding, both to retain the old architectural features as well as to save time. It was also decided to reconstruct the upper stories in reinforced concrete.

The old steel columns of the original lower floors were reinforced and enclosed in concrete where it was possible to retain them. Elsewhere new concrete columns were started at the basement level. It was also necessary to construct concrete wall columns to carry the floor spans, and avoid heavy load concentrations on the old exterior brick walls. The concrete floors were constructed by the removable pan system, and this in turn was carried by longitudinal and cross girders of reinforced concrete. The concrete mixture was one part

cement, two parts of sand and four parts of ¾-in. stone.

The reinforcing for columns, girders and beams was plain round rods, using wire mesh for the upper portion of the floor slabs.

All of the concrete was poured in winter weather, when the temperature averaged well below zero. The stone, sand and water were heated, and the green concrete covered with tarpaulins. The under-side of the slabs was heated by salamanders fired with coke. The removable pans caught and retained a large percentage of the heat, which was maintained at a maximum for about one week. The heat was then reduced gradually, and the forms struck on the floor slabs after two weeks, and from the heavy girders after three weeks. Temporary shores were maintained under the girders as long as possible after the forms had been removed. No failures or frozen concrete were experienced on any portion of the work.

Special Construction for Roof

Most of the steep pitched roof contains two floors of bedrooms, and because of its intricate form, was constructed of structural steel rafters, purlins, hips, valleys, etc., with steel tees to receive the precast three-inch gypsum blocks that formed the roof slab. The gypsum block roof slab was stripped with 2-in. by 4-in. wood sleepers to receive 1⅛-in. tongue and groove sheathing. The entire roof was covered with 16-oz. sheet copper. The main hips and valleys were encased in concrete to fireproof them, and the floor slabs in the roof space were constructed of reinforced concrete, supported on fireproofed steel beams.

The erection of the structural steel for the roof was a difficult piece of work, and was done under adverse conditions of wind and temperature. A large percentage of it was handled with a boom derrick and power hoist, but the more inaccessible sections were erected with small hand-operated stiff leg derricks. The major portion of the reinforced concrete work had been completed by the time the structural steel began to arrive at the site.

Also Rebuild Citadel Wing

One of the adjoining sections of the building known as the Citadel wing, although not touched by the fire, suffered severe damage by water. As this was the only remaining wooden portion of the building, it was decided to demolish the interior of this section and rebuild it in fireproof construction, to conform to the other portions of the hotel. This was done and an interesting feature of this operation was the fireproofing of the roof without removing the original copper or wood sheathing under it.

The interior partitions and floors were removed and the wooden trusses shored up, one truss was then removed and the old 2-in. by 10-in. wooden rafters cut down on the under-side to 2 in. by 2 in. The first panel of the structural steel was then erected, the gypsum blocks set by sliding them in edgewise between the T-irons, and finally the rafters (now 2 in. by 2 in.) were lag-bolted through the gypsum blocks and made secure. The next wood truss was then removed and the operation repeated. The entire work was done without settlement or other damage to the old roof, and resulted in a considerable saving in time, and avoided opening up the building to the weather at any period of the reconstruction.

The entire bedroom arrangement was revised to conform to modern hotel practice, with a bath to every room and vertical pipe shafts to each tier of bath rooms. All interior partitions were constructed of standard four-inch hollow terra cotta blocks. The jamb and casings

The Old Outside Walls Were Retained in Reconstruction

to all doors in these partitions were No. 14 gage pressed steel, set and built in as the partitions were erected.

All ceilings were furred with metal furring attached to the underside of the concrete floor construction, wire lathed and plastered with a three-coat work hard white finish. The partitions were plastered directly on the terra cotta. Exterior walls were furred with three-inch terra cotta blocks and the plastering was applied direct to the furring.

The finished floors throughout the bedrooms are concrete two inches thick, treated on the surface with liquid hardener to prevent dusting. Chestnut sleepers were embedded in the concrete and extended around all sides of the rooms to provide carpet nailing strips.

Special Provision for Severe Winters

The frames and sash for all windows in the exterior walls are of white pine and the space between the masonry and the frames was caulked with mastic compound; the sash were weatherstripped and all frames were equipped with a second set of sash for winter use. The extreme cold and high winds which prevail at times required special care in the setting and treatment of all window frames and sash.

The plan of this portion of the building naturally divides it into four distinct sections, and fire walls were built to separate them. All corridor openings through these walls are protected with specially constructed heavy hollow steel swing type fire doors equipped with panic bolts and bars, and also an automatic closing device with a fusible link to shut them in case of fire. The high efficiency and sturdy character of this type of door was fully demonstrated at the time of the fire. All openings in fire walls larger than four feet by seven feet were equipped with standard rolling steel curtains in pairs, one on each side of the wall, operated by the Lowe automatic remote control system.

Public Rooms Attractively Decorated

The heating system is a vacuum low pressure, carried on exhaust steam at two-pound pressure. Each radiator is equipped with a shut-off valve on the supply line, and a thermostatic trap on the return. The electric wiring for the lighting and telephone system was run in conduit in accordance with standard practice, and each room is illuminated by a center ceiling fixture of the enclosed unit type with polycase glassware, a bracket light over the mirror, and table lights for the writing desk and bed table.

The public rooms such as lounge, writing room, library, coffee shop and cafe tavern and the special bedroom suites were finished and decorated more elaborately; marble floors, quartered oak trim and Craftex wall finishes were employed extensively, but the other portions of construction were the same as used elsewhere throughout the building.

The Work Was Carefully Scheduled

Approximately 1,100 doors, 1,100 steel door frames, over 400 windows, 600 baths, lavatories and other fixtures were required in the reconstruction work. In addition, over 1,600 lighting fixtures, 2,500 switches and base plugs were installed, besides large quantities of ordinary construction materials.

To apply all this material and allow time for concrete to set, plaster to season, painting to dry between coats, and do it within the 127 working days available, made it necessary to work 24 hours per day in three shifts, and this program was maintained throughout practically the whole operation. Orders were placed for every item required at the start of the work, and deliveries scheduled to conform to a construction schedule. An effective follow-up system was arranged and inspectors sent to the manufacturing plants where the more important items were being made. It was demonstrated that the system was successful only when the "follow-up" started immediately after the order was placed.

In addition to this, a careful time analysis was made periodically in conjunction with the construction schedule. It was found possible to calculate the time of completion on each item by basing the forecast on past performance, and in this way determine the man rate and the number of men required. By this means most of the items were carried to completion ahead of the schedule. Instead of completing the entire job on the final date, large sections of the bedrooms were turned over for carpeting and furnishing two or three weeks in advance of the schedule. The public rooms and special bedroom suites, however, due to their more elaborate finish, required the utmost effort and concentration, and were completed by the narrow margin of a few hours.

The work was planned by the engineering department of the Canadian Pacific. The general contractors were Anglin-Norcross, Ltd., of Montreal.

Brief in Support of Southwestern Merger

WASHINGTON, D. C.

A BRIEF in support of the application of the Kansas City Southern to the Interstate Commerce Commission for authority to acquire control of the Missouri-Kansas-Texas and the application of the latter for authority to acquire control of the St. Louis Southwestern, has been filed with the commission by counsel for the railroads involved. Among the points made in the brief are the following:

The southwestern region should be considered and dealt with for transportation purposes, and particularly for the purposes contemplated by section 5 of the interstate commerce act, as a separate and distinct territory.

The public interest requires the formation of a system of railroads in the southwestern region in addition to the systems contemplated by the commission's tentative consolidation plan.

The grouping of carriers within the southwestern region has already proceeded, with the approval or acquiescence of the commission, to a point where the three carriers involved in the pending applications are the only important carriers within the southwestern region not affiliated with one of the major systems formed or forming whose lines in whole or in part lie within the southwestern region.

The traffic, business and ability to serve the public of the three carriers involved in the pending applications have already suffered by the inclusion of neighboring carriers in competitive major systems and are likely to be further unfavorably affected thereby, since it will lie in the power and be in the interest of such major systems, as their potential ability to control traffic becomes more fully realized, to add to their own business and revenues at the expense of their weaker competitors.

Unless a grouping of the three lines be permitted in their mutual interest, they will continue to be operated at a serious disadvantage, as unrelated and isolated properties, to the detriment of the public as well as themselves or, in the event of affiliation of any one or more of them with any other major groups, the traffic, business and ability to serve the public of the other or others will be unfavorably affected.

Railway Progress in Great Britain and America*

An English railroad officer's study of development of equipment and operation in two countries under widely different conditions

By R. Bell

Assistant General Manager, London & North Eastern Railway of England

LONG before Henry Ford was heard of, the Baldwin Locomotive Works had become an American institution. For 95 years these works have constructed railway engines and every year the size of the engines has been growing. The president of the Baldwin concern is Dr. Samuel M. Vauclain, who has the knack of turning a pungent phrase. Recently he addressed a gathering of American railwaymen in this fashion:

"Wherever locomotives are operated abroad they operate very nicely. You seldom hear a clanking rod on these locomotives, but, gentlemen, they are mere 'whispers' as compared to the locomotives you are operating in this country. They are locomotives, of course, but they would be entirely useless so far as the transportation requirements of this country are concerned."

That hits off crisply enough the difference between the working conditions in the states and in Great Britain. Geography accounts for a lot. The map shows how the states cover over three million square miles, or roughly 35 times the extent of our island. Their physical features are on the same huge scale. They are rich, too, in natural resources. The internal trade is gigantic, but there is a large surplus of production left for export. The volume of rail-borne freight expands at an astonishing rate.

Pennsylvania and London & North Eastern

Let us compare the movement of traffic on the Pennsylvania Railroad and the London & North Eastern Railway, glancing first at some points of resemblance between the two lines. The Pennsylvania includes one of the oldest railroads in the states, which was constructed from Philadelphia to Columbia under an act passed in March, 1823. Just as the London & North Eastern was built up by a process of amalgamation, the Pennsylvania has taken over properties formerly owned by more than two hundred companies. Both systems serve regions where coal mining, iron and steel making and other heavy industries predominate. Both are primarily carriers of freight, though the "Broadway Limited," which runs from New York to Chicago, is as famous as the "Flying Scotsman."

The route mileage of the Pennsylvania line is 10,500 miles and that of the London & North Eastern 6,720 miles. The number of locomotives owned is practically the same, and though the number of freight wagons on the Pennsylvania is 20,000 less than our figure of 280,000, the American cars hold five times as much. With our equipment we handle 158 million tons of freight in a year, yielding 6,303 million ton miles. The Pennsylvania deals with 217 million tons and its ton mileage runs into eleven figures, representing six and one-half times our total.

Almost more startling than the size of the ton mileage is its rate of growth. Since 1884 it has been trebled at intervals of 20 years. In sharp contrast the ton-mile figure for our North Eastern Section only moved from 1,224,295,000 in 1904 to 1,619,400,000 in 1924, an increase of 32 per cent.

Clearly the Pennsylvania requires an equipment of a very different nature from ours and here is the rather spectacular way in which its chief of motive power, J. T. Wallis, brings this out:

"The railway rates are higher in England than they are in this country. The total earnings of the four English systems are approximately 900 million dollars a year. It just so happens that the earnings of the Pennsylvania Railroad are about one-tenth of the earnings of all the railroads in this country, or approximately 700 million dollars. I believe the earnings of the Pennsylvania Railroad would be as high as 900 million dollars a year if our rates were as high as the rates in England. The Pennsylvania Railroad, which in this respect is not any better operated than any other carrier, earns this money with approximately 7,000 locomotives while there are about 24,000 on the English railways.

"The foregoing is not said in the spirit of criticism of English railways. I am not one of those who think English railways should adopt all our methods and use our equipment. I have seen enough to make me believe that is not possible, and at any rate I should not want to express a fixed opinion on that broad subject after only a flying visit."

English and American Locomotive Practice

That is a very fair statement, and to illustrate it, here are a few examples of recent locomotive practice in the states, taken rather at random. The Union Pacific put into service this year a three cylinder locomotive with a 4-12-2 wheel arrangement. This is probably the first successful attempt to use 12 coupled driving wheels. The engine can develop a tractive force of 96,650 lb., or two and a half times the tractive force of the North Eastern 8 coupled class.

As remarkable as the size of the locomotives is the length of engine runs in America. The Missouri Pacific claims the record for a non-stop trip for a freight train, 162 miles in 5 hours 55 minutes, from Kansas City to Jefferson City. The train consisted of 57 cars and weighed 2,455 tons. The trip was made possible by attaching to the engine an auxiliary tank holding 10,000 gallons of water. On a neighboring railroad, the Missouri-Kansas-Texas, a "Mikado" covered the distance of 182 miles from Franklin to St. Louis in 7 hours 50 minutes. In that case also an auxiliary water tank was hauled and the train of 77 cars weighed 3,797 tons. The locomotive consumed 32 lb. of coal per 1,000 gross ton miles, which is a record for the "Katy," as the railroad is usually called.

The long American freight trains pull out of a siding

*From a paper presented at a meeting of the Newcastle & Sunderland Railway Lecture and Debating Society, at Gateshead, Eng., on October 21, 1926.

by slow and painful efforts, so that the elimination of every stop means a saving in fuel as well as time. On some of the long stretches of the Great Northern the number of halts for water is being reduced by building tenders with a capacity of 21,500 gallons. The standard tender in use on the Great Northern holds from 12,000 to 15,000 gallons, enough to fill three of the tenders provided for the London & North Eastern "Pacifics." With stops for water and station working, the Southern Pacific work engines regularly from Houston to El Paso, a distance of 832 miles. The Northern Pacific made another record by running a coal-burning locomotive for a distance of 1,898 miles. The journey took 109 hours and 30 minutes, giving an average speed of 17 miles an hour. It is stated that no mechanical difficulties were encountered on the way.

Still another record was made when the largest oil train ever made up left Coffeyville in Kansas. This train consisted of 97 cars of petrol weighing 4,500 tons and the freight charges amounted to over $10,000. Records apart, the increase in the weight of locomotives and trains is so general that many railroads are now laying down rails weighing 130 and 136 lb. to the yard. Before the war, American engineers, like our own, had been satisfied with rails of about 95 lb. in weight as a standard.

Besides being hard on the permanent way, the big engines are heavy consumers of fuel. In May of this year the consumption of locomotive coal in the states was 7,844,354 tons. In addition 165,557,000 gallons of fuel oil were used, the equivalent of, say, another 1¼ million tons of coal. In a whole year the British railways use about 13½ million tons of coal, which would just keep the wheels turning in America for six or seven weeks. The American coal cost about 12s. 6d. per ton. In April last the London & North Eastern were paying 16s. per ton at the pithead. Since May they have bought over a million and a half tons of American and Silesian coal at an average cost of 38s. per ton or thereabouts, free on truck at our ports.

Importance of Saving Coal

Probably the public does not appreciate the serious addition to their working expenses, which the company have incurred, in keeping their services going. There is a further question whether railwaymen fully realize the importance of saving coal. In August, 1924, when coal was selling at 22s. a ton, the London & North Eastern pointed out to their enginemen that if every locomotive burnt one pound of coal less for every mile it ran, the company would use 75,000 tons less in a year and save £80,000. Round about 125 lbs. of coal are needed to haul 1,000 tons of freight and equipment, excluding the locomotive and tender, a distance of one mile. In America, 159 lb. are required, because the fuel is inferior and gradients are worse, not to speak of weather conditions. This statistic is not regularly kept in this country, but it is worked out in America, and showed a reduction of 11 lb. for 1925 on 1924. This meant for the whole year a decrease in consumption of nearly 440,000 tons, or enough coal to run the London & North Eastern for five weeks. This economy is attributed to three factors: improvements in locomotive construction; the prevailing tendency to longer runs, and the education of the staff in the need for better working.

Automatic stokers were introduced in America in the year 1909. They help to keep down the consumption of fuel and don't grumble like some of our firemen when they are asked to handle small coal. They scatter the coal in the fire box in such a way that a thin incandescent fire is maintained over the entire grate surface. A recent test on one of the western railroads showed that a freight locomotive burned from 290 to 350 lb. of coal for every thousand gross ton-miles when it was fired by hand. The consumption went down to the region of 210 lb. when an automatic stoker was installed, giving a saving of over 25 per cent. Another effective device which has come with the use of powerful locomotives is the "booster." This auxiliary engine utilizes the excess steam which a large boiler supplies at low train speeds. It makes for a quick start from rest, helps on a steep gradient and enables the operating superintendent to increase his train load by 20 per cent or even 35 per cent, according to the size of the locomotive. The use of the "booster" is regarded as common form on some American railroads. In Great Britain an Atlantic and two Mikados on the London & North Eastern have been equipped recently, but it is too early to pronounce definitely on the results of this rather limited experiment.

Figures Not Compiled

Oddly enough figures for the net ton miles for coal traffic alone are not compiled in the United States. Coal is lumped for statistical purposes with other "products of mines." The forwardings by rail are known to amount to more than 400 millions tons and the average length of haul is certainly over 150 miles. The British railways carry less than half that tonnage of coal, coke and patent fuel for an average distance of only 45 miles. In coal, America is supreme and she seems to have over-developed bituminous coal mining. That branch of the industry produced 483 million tons in 1924, but has not been in a prosperous state for some years. Too many mines have been opened and too many miners employed.

The stoppage of our pits this year gave the American coalmasters fresh outlets, and exports from the Atlantic seaboard were practically doubled. So keen was the demand for coal that it was necessary in August last to allow ten days from the date of purchase for getting the coal down from the pit to tidewater. The American method of working shipment coal is much the same as the practice so long established in the North Eastern area. Dispatch to the point of shipment is regulated to suit the arrival of boats. During August and September the railroads restricted the loading of coal for shipment at Hampton Roads to three days per week as the piers were fully occupied. The coal is carried for the most part in cars owned by the railroads. There are only between 30,000 and 35,000 coal cars not directly controlled by the railroads, a small number in relation to the total of nearly a million coal and coke cars on line. The average capacity of the American car is 52 tons and the contents are shot into the vessels from the coal piers much faster than our tippers can teem our small wagons. There is a record that a steamer served by four conveyors at Sewall's Point took on board 11,875 tons in two hours and three quarters, a rate of 67 tons a minute. At ports on our northeast coast or in South Wales, shipment at a rate of 700 tons an hour is regarded as quick dispatch. Often the piers in the states are equipped with mechanical appliances which do a great part of the trimming by throwing the coal in to the far corners of the hold. These machines are speedy and economical, but they reverse the role of our "anti-coalbreakers" by smashing much of the coal to fragments.

Not content with the lead in coal, the United States have gone ahead of other countries in the production of crude petroleum. Her oil fields turn out about 70 per cent of the world's supply. The development of a new field gives the American hustler his chance. Here is how he takes it in Arkansas. Near El Dorado, the Smackover oil field was opened five years ago. The

population was then three thousand; it is now thirty thousand. Before the oil wells were put down, Smackover and two adjoining stations on the Missouri Pacific had business worth $2,500 a year; in 1925 the figure was $15,000,000. The field now turns out 200,000 barrels of oil a day and may do so for two or three years longer. Then the rate of production will drop and in fifteen years' time the field may be exhausted. When traffic fluctuates violently in the short space of twenty years, the strain thrown upon the railroads is intense, and we should perhaps be thankful that changes in the old world come more slowly.

Investment of Capital Helps Labor

The development of the coastal coal field of Durham between Sunderland and Hartlepool affords a good illustration of our leisurely procedure. The North Eastern bill for a new line from Hartlepool to Seaham received the royal assent in July, 1894. The line was not handed over by the contractor until the end of 1903. Constructional material could then be railed to the pitheads at Easington and Horden and the branch line was in full working trim in September, 1905. * * *

The Durham Coast line cost the North Eastern £339,000 and the company also incurred expenditure on wagon stock and dock facilities in dealing with the output of the new pits. The amount of capital required for railway purposes may not be impressive, but it is large in proportion to the number of additional employees needed for the new line. About £1,500 of capital must be found for every railwayman who is employed. One-seventh of that amount invested in a modern Durham colliery is sufficient to start one miner at work. A sixth will give employment to another steelworker. There must be a continuous flow of capital into the three industries on that scale if the children of the workers are to follow the same occupation as their fathers. Failing expansion in this way by the aid of fresh investments, the offspring of the workers must find some other means of subsistence; for many emigration may be the only means of escape. The argument applies to the railways with special force because they must spend capital freely on new equipment and additional facilities. There is no other way of increasing traffic and keeping down working expenses.

Operating Results in "The States"

In this respect the Americans can read us a lesson. Since the war their railroads have spent large sums on the betterment of their properties and this year have authorized a capital expenditure of 822 million dollars. This bold policy has paid. The railroads have improved their freight service to such an extent that merchants and manufacturers have been able to work on reduced stocks of commodities. For three years car shortages have been practically unknown. The transit time of freight traffic has been cut down by a third and consignees can depend on regular deliveries. The improvement in the freight service has been accompanied by a steady rise in the rate of return on railroad investments. In 1921, the rate was only a shade over 3 per cent, for the first half of this year it was nearly 5 per cent, and for the month of June alone, close upon 5½ per cent. If this tendency to better returns is maintained there need be little fear that capital will be available for railroad purposes and there are few objects to which money can be supplied with more advantage to the public welfare.

The operating results obtained in the states during recent times may be profitably examined in some detail. In May last the average train load was 771 tons and it is probable that the figure will advance to 800 when traffic is heavier in the fall of the year. The train load in this country has not been more than 133 tons during the last six years and fell last year to 130. Since 1920, the average number of cars on the American freight train has gone up from 37 to 46, over the same period the number of wagons on our average train has been nearly constant at 35 and the worst of it is that we are hauling eleven empty wagons on each train, or one more than we were pulling in 1920. There is little satisfaction in knowing that the American railroads are also struggling to keep down empty car mileage. In May, 1920, only 29 per cent of their freight cars were moved empty; in May, 1926, the percentage was 36. Put in another way, the number of empty cars had increased from eleven to seventeen on an average train. Our wagon load, too, never gets much above 5½ tons, though the tonnage capacity of our trucks has gradually increased to 10.75 tons on an average. The steady replacement of 8 or 10-ton trucks by 12-ton goods wagons is telling its tale and the number of 20-ton mineral wagons is also slowly increasing. The American railroads secured an average car-load in May of 26.8 tons, but for them that is a poor result. Three years ago cars were loading up to 28 tons on an average. Apparently for the time being the increases in the size of cars has outstripped the ability of the shippers to find full loads. There is also reason to think that light loading commodities now constitute a larger proportion of the total freight traffic.

Motor Competition

The Americans have been much more successful in improving the speed of their freight trains. The average speed in May last was 12.2 miles an hour as compared with 11 miles in 1923. Our average figure has never reached nine miles an hour and has fallen by at least half a mile an hour since 1922. The consequence is that the useful index "net ton miles per train engine hour" has been moving in different directions. In the states the figure has advanced steadily from 7,802 in May, 1920, to 9,526 this year, a change of 22 per cent; with us the figure rose from 865 in 1920 to 955 in 1922, but has now dropped back to 901, which was the level reached in 1921.

One would like to go a step further and compare the gross ton-miles per train hour on the two sides of the Atlantic, but outside the North Eastern area of the London & North Eastern Railway, figures do not appear to be available in Great Britain. The trend of this statistic in the states is causing a good deal of thought, as in the average train the tare weight of the cars now exceeds the paying load by 212 tons; six years ago the excess was only 20 tons. The weight of the cars hauled in the train has increased five times as fast as the tonnage of freight carried.

We may be certain that strenuous efforts will be made to stop this increase in the dead weight hauled on trains. At present it is one of the few weaknesses which have not been cured by the vigorous methods of management adopted since the war. These methods have brought down the proportion of operating expenses to revenue from 82 per cent in 1921 to 74 per cent in 1925. In June last, the operating ratio fell to 72 per cent and it will be interesting to see whether it drops further by the end of the year. The corresponding figure for British railways was 84 per cent, in 1925, and is bound to be higher this year through causes which were beyond the control of the companies.

The American railroad man does not need to regard motor competition for freight traffic too seriously. There are two and a half million motor trucks on the high-

ways, but their capacity is less than 3 per cent of the capacity of the railroad cars. The ton mileage of the motor trucks is estimated to be less than 4 per cent of the freight ton mileage of the railroads. Much of the motor mileage is run on city streets and in business which is not competitive with rail. Possibly 5 per cent of the motor trucks belong to common carriers, and at some points the railroads are handing over to these motor haulers less than carload freight even for fairly long runs, such as from Buffalo to Rochester, about 68 miles. A number of railroads have also replaced freight trains on branch lines by motor lorries. On the whole, however, the American freight canvasser (or solicitor, as he is termed) can regard the motor truck as an ally for feeding the railroad rather than as a dangerous enemy. The huge dimensions of the freight business and the enormous distances over which much of the traffic is moved, restrict road competition in a way which would rejoice the hearts of our goods managers.

In the case of passenger traffic, there is a different story to tell. During the five years ended 1925, motor competition was steadily reducing passenger business. The damage is done chiefly by the private automobile, of which there are 18 millions. Though there are 70,000 buses in the states, only 30,000 of these are common carriers. The seating capacity of the automobile is estimated to be 25 times the capacity of railroad passenger cars. The competition over short distances is thus acute, but in some of the states motor services are prohibited if they run practically alongside a railroad. The Illinois Supreme Court recently decided that the railroads are entitled to an opportunity to provide all necessary transport service before a competing concern is given a certificate to put buses on the highways.

Motor Vehicles on Roads

How different is the position in Great Britain, where mile after mile of railway line is paralleled by roads which are used almost without restriction by competing bus owners. Some of the American railroads are running fleets of buses themselves, but their best course may be to leave much of the short travel to the automobile. There are signs that better paying businesses may possibly be developed in other directions. During the first quarter of this year, the number of passengers carried was 26 per cent below the 1920 figure, but earnings were up by $5,200,000. The increase was due to the growth of long distance travel, especially in Pullman sleeping and parlor cars, for the use of which a surcharge is made. There would seem to be scope for cultivating this class of travel more intensively. Already slogans like, "See America first" resound through the states and may divert to the railroads money which would have been spent on a European tour if there had been no advertising campaign to broadcast the virtues of the homeland.

Experience on both sides of the Atlantic shows that the train still holds its own as a means of dealing with excursion traffic on a large scale. During the past summer to the end of August, the London & North Eastern ran 604 half day excursions to popular seaside resorts, like Scarborough, Cleethorpes, Skegness, Clacton and Southend, at fares varying from 5s. to 7s. 6d., for distances of 100 and 160 miles, respectively. These excursion trains carried 298,582 passengers, giving in many cases a train load of 600 people. In some cases the receipts per train mile were as high as 36s. 5d. The other British lines could quote similar results, but America claims credit for the greatest one day excursion passenger movement, when 300,000 people were conveyed from Chicago to Mundelein Junction. This trip of forty miles and back was the leading feature of an ecclesiastical celebration which brought 600,000 visitors to Chicago from all parts of the world. The Chicago, North Shore & Milwaukee Railroad alone carried 225,000 of the day trippers.

In spite of outstanding performances of this kind, passenger business is distinctly subordinate to freight in the United States. The passenger department over there accounts for little more than 25 per cent of the total revenue; in Great Britain it brings in 47 per cent for all the railways, but only 39 per cent on the London & North Eastern, whose prosperity depends so much upon the heavier industries.

Suburban Service and Electrification

The rapid growth of American cities has brought the railroads up against the problem of dealing with suburban traffic. Here again the experience of the old country is being repeated. Take Chicago for example. Its population in 1848, when the first railroad was built, was under 25,000 inhabitants. In 1856, the Illinois Central System operated two through passenger trains and four suburban trains daily in either direction. Today the population of Chicago is more than 3,000,000, and the Illinois Central operates 34 through passenger and 418 suburban trains upon its Chicago terminal alone, and carries daily more than 80,000 passengers. The railroad has just electrified 47 route miles and has quickened up its services.

The conversion was not brought about by economic necessity, but by the pressure of public opinion. The demand for electrification had gone on for years since the railroad was allowed to run along the lake front and had been intensified of late by a campaign to get rid of smoke pollution in Chicago. The railroad cannot count upon getting much additional revenue from the project and any savings in operating costs are not likely to be commensurate with the capital expenditure.

This expectation hardly squares with the view propounded by R. H. Selbie, the president of the Institute of Transport, in his inaugural address two or three weeks ago. Mr. Selbie thought that the substitution of electric for steam motive power could be carried out at a comparatively low cost and would solve straightaway the difficulties of handling suburban traffic. A safer opinion, with which many railroad managers in the states would agree, is that each scheme for electrification must be judged on the strength of the particular conditions which attach to the section of line. The deciding factor cannot always be merely the existence of a dense passenger or freight traffic. The London & North Eastern have one of the busiest sections of track in the world at Liverpool street. With the present steam service of main line and suburban trains the average capacity of the lines between Liverpool street and Bethnal Green Junction is twenty trains per track per hour; one track is actually used by twenty-four trains in an hour of extreme pressure. It is doubtful whether there exists an instance of any electrified section of a steam operated railway approaching these figures.

Even if we assume that electric traction increased the track capacity by 10 per cent, more passengers would not necessarily be carried in comfort at rush hours. Owing to the room required for motor space, a multiple unit train of eight coaches provides 640 seats, but a London & North Eastern steam bogie set can seat 950 passengers. In practice the "turn around" time for an electric train is five minutes, and there is consequently not much reduction in platform use. At Liverpool Street, in any case, the limit of capacity is the rate at which trains can be passed through Bethnal Green Junc-

tion and switched to or from the station platforms. Electrification of the suburban lines would not by itself avoid delays to trains. Expensive works would have to be taken in hand at the same time and under the present conditions of industrial depression, the high capital cost seems prohibitive. Altogether America has electrified 1,460 route miles out of a total of 237,000, or less than 1 per cent.* In Great Britain, 407 route miles had been converted up to the end of June, 1926, or 2 per cent of the 20,000 route miles owned by the four large groups and the Metropolitan Railway. The Southern Railway (of England) has to its credit the largest scheme of suburban electrification in the world, and it is understood that the "third rail" will be adopted throughout. In America much more use is made of electric locomotives working with an overhead catenary equipment. The Pennsylvania is, at the present time, extending its electrified lines round Philadelphia on that system. On the line from Philadelphia to Wilmington, a distance of 28 miles, they propose to use electric locomotives which can take 16 Pullman cars along at 75 miles an hour or, with a change in the gearing ratio, handle 100 loaded freight cars at 35 miles an hour. These must be the most powerful machines known in the history of transport.

Signaling and Train Control

The use of electric power has brought about a revolution in another branch of railway working. By the use of track circuits and the movement of distant points by electric power, signalling has been placed on a new basis. Greater safety has been secured, though the number of signal boxes has been substantially reduced. Since 1923 no fewer than 79 signal boxes have been eliminated on the London & North Eastern, with an attendant economy of £33,000 a year. Electricity has also made the installation of automatic signals possible, but in Great Britain only isolated sections of lines are so equipped. More progress has been made of late years in America. The total length of line operated there under the block system is about 110,000 miles. On more than two-fifths of the mileage, the signals are automatic, and it is expected that by the end of this year 3,000 additional miles will be changed over. The Great Northern Railroad had just completed the automatic block signalling of its main line from St. Paul to Seattle, a distance of 1,794 miles. This is the longest unbroken installation of automatic signals in the world, and about a third of the mileage is worked by color-light signals for use both by day and night.

The use of automatic train control is also extending in America, where the Interstate Commerce Commission has power to order a railroad to equip busy lines with this device. The commission, it is only fair to say, has not always insisted upon its order being carried out if the particular railroad could show that it had to meet more pressing demands for expenditure. For instance, the Kansas City Southern Railroad was ordered, in June, 1922, to install automatic train control on 124 miles of line by January, 1925. The railroad convinced the commission that, in view of the low density of traffic and slight risk of accident on this portion of line, its first duty was to improve its services by spending money on betterments and new construction.

The action of the commission in recalling its order is a great contrast to the policy of some public bodies in the states, which are prone to worry the railroads with restrictions and harass them with taxation. During the first half of this year the taxes paid by the railroads in the states increased by 8 per cent, when compared with the corresponding period of 1925. Going back to 1920, the increase is about 40 per cent. By way of contrast over the same period of six years, the railroads brought down their operating expenses by 20 per cent, and their efforts to provide cheap and efficient transport must be hampered by a load of taxation which eats up nearly 6 per cent of their gross receipts. In Great Britain the proportion of gross receipts which goes to the tax gatherer is 3.5 per cent, representing a round sum of £7,660,000.

*This evidently refers to mileage of Class I roads only.

Railway Taxes in Great Britain and America

Our railways have also to bear a heavy share of the cost of the social legislation which has been passed in the interests of the workmen during recent years. America has not, so far, sought to protect her work-people to the same extent against the effects of accidents, ill-health, unemployment or old age. Desirable as these objects are, it will be a pity if they can only be bought at the price of higher railway charges. After all, the great problem on both sides of the Atlantic is to secure to the railways an adequate revenue. The solution rests with the Interstate Commerce Commission in America, and with the Rates Tribunal in this country. Neither body has yet reported how it proposes to establish rates which will give the carriers a reasonable return on the capital invested in their undertakings and so leave them free to provide a service equal to modern requirements.

Enough has been said to show that the American railroads, on the whole, are passing through a period of prosperity and progression. Let us hope that they will not be faced with a stoppage in the coal trade next April when the agreement between the miners and coal operators expires. Before our own mines ceased to work in May last, the railways were recovering a good deal of lost ground. On the London & North Eastern expenses for the first four months of the year had been reduced by £400,000, or thereabouts, and revenue had increased by approximately the same amount, as compared with the corresponding period of 1925. This net improvement of £800,000 has been wiped out by a drop in receipts of eight millions, which will not be off-set by savings in working expenses to the extent of more than 40 per cent. The situation could hardly be worse.

Ever since the Stockton & Darlington line was opened in 1825, this area has kept its place as a pioneer. The old North Eastern was the first main-line company to electrify a section of its railway for passenger working. The working of freight traffic by electric locomotives on the Newcastle Quayside Branch and also on the Shildon & Newport line was an experiment which has not yet been imitated in this country. The equipment of the Hartlepool and Middlesbrough Docks with electric cranes in the early years of this century was another move in advance of the times. In 1902 the use of 20-ton wagons for mineral traffic was adopted as a standard for the area, and more than twenty years passed before any other company moved in the same direction.

Education of Employees

About the same date a system of statistics was instituted on the North Eastern, which formed the basis for most of the information now compiled by the Ministry of Transport for all railways. In the matter of statistics, the North Eastern followed the lead of America; when making arrangements for the education of its staff in 1909, it set an example to railways everywhere. Before that date, instruction in railway subjects was open to a limited number of the companies' employees in London and in one or two other cities. The main merit of the North Eastern scheme was that it brought educa-

tion to the doors of the great majority of the staff who could aspire to hold supervisory positions. The scheme has been extended since amalgamation to cover the whole of the London & North Eastern staff. On no other railway, either in the states or in this country, are the benefits of study under the guidance of skilled instructors offered so freely to the young railwayman possessed of keenness and ambition.

In the years of struggle which lie ahead, much is to be hoped from the students who have been wrestling with the principles of railway management in the university classrooms. The future is full of difficulties, but we can be more hopeful that these will be surmounted when we know that the coming generation of railwaymen will not be unready. For has it not been said in memorable words that "a complete and generous education . . . fits a man to perform justly, skilfully and magnanimously all the offices, both private and public, of peace and war?"

Report of Bureau of Safety

THE report of W. P. Borland, director of the bureau of safety of the Interstate Commerce Commission, for the fiscal year ended June 30, 1926, has been issued, in a pamphlet containing also extracts from the annual report of the commission pertaining to matters dealt with by this bureau.

A brief summary of the work done by the bureau, as given out by the commission with its annual report, was printed in the *Railway Age* of December 11, page 1172. The statistical matter there summarized fills about 25 pages of the present report. The defective appliances found by inspectors on freight and passenger cars and locomotives are classified in great detail; and most of these details are presented also in supplementary tables which show the total defects and faults found on each road, this table, however, dealing only with roads on which 500 or more cars were inspected during the year.

Since the commission's investigation of power brakes in 1924, the bureau has been working in sympathetic co-operation with the mechanical division of the American Railway Association, and the relations between these two bodies are spoken of as highly satisfactory. A notable exception, however, to the general good spirit manifested by the railroads is the case of the Terminal Railroad Association of St. Louis. This company, according to the report, appears to deem it less expensive to pay penalties than to comply with the law; it has paid $13,000 in penalties during the past year without contesting a single case. This course, says the report, defeats the purpose of the law which is to secure improvement in practice.

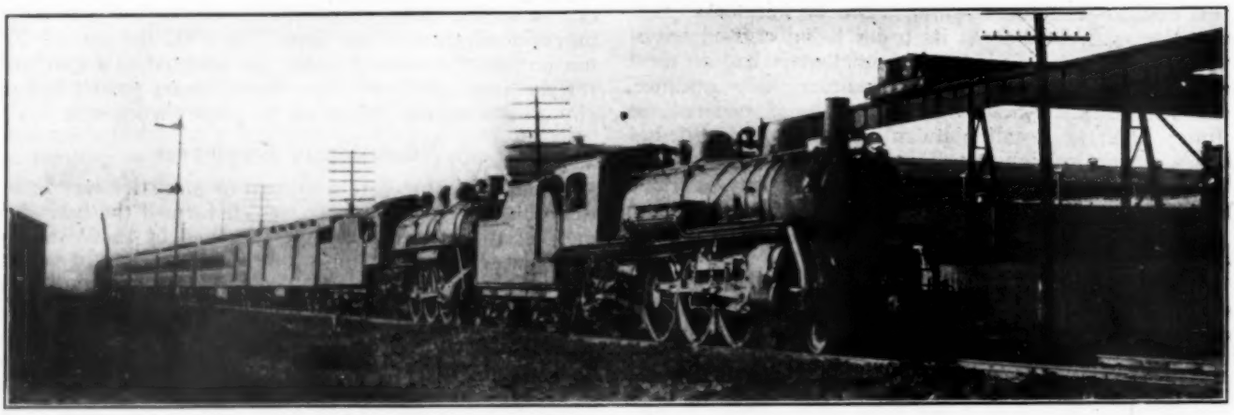
In the discussion of train accidents, the report devotes large space to its investigation of transverse fissures in rails, this subject having been the object of intense study on the part of the bureau for several years. Search is being made to discover what peculiar traits, if there are such, are responsible for the premature development of transverse fissures. Encouraging reports have been received as to the value of rails made of steel containing from 1.25 to 1.75 per cent of manganese, and rails of this character will be made the object of careful inquiry. Hopeful comments are made also on experiments designed to devise, if possible, some means of detecting transverse fissures, the idea being to place a detecting apparatus on a car to record conditions in rails under moving wheels. Railroads and rail manufacturers are actively co-operating with the government.

Suits prosecuted by the government for violation of the safety appliance acts are briefly recounted in the pamphlet. In a suit against the International-Great Northern (9 F (2nd) 142) two freight cars chained together for a long load, were thereafter run two miles empty and this two-mile movement was alleged to be unlawful, but the District court for the Southern District of Texas decided that the law had not been violated.

In a suit against the Texas & New Orleans (13 F (2nd) 429) the same court approved the movement of a locomotive and 27 cars over the main line for about a mile, without air brakes, a stop having had to be made about every 100 yards to do work at industries. The court held that this was not a train movement; but the Bureau of safety complains that it was not advised of the time of the trial and that, therefore, the suit was decided on insufficient or unreliable testimony.

The District court for Nebraska, in a suit against the Illinois Central, condemns as unlawful the movement of a locomotive and 18 freight cars for a distance of 4500 ft. in Omaha without air brakes being used. The railroad has claimed that this was a yard movement but it was over several city streets and one or more railroad crossings.

The Supreme Court of the United States, in the case of the Santa Fe yard-masters (269 U. S. 266) reversed the lower courts and held that the messages handled by the yard masters [ordering yard movements] were not train orders and hence the employees handling the messages were not subject to the hours-of-service law pertaining to operators.



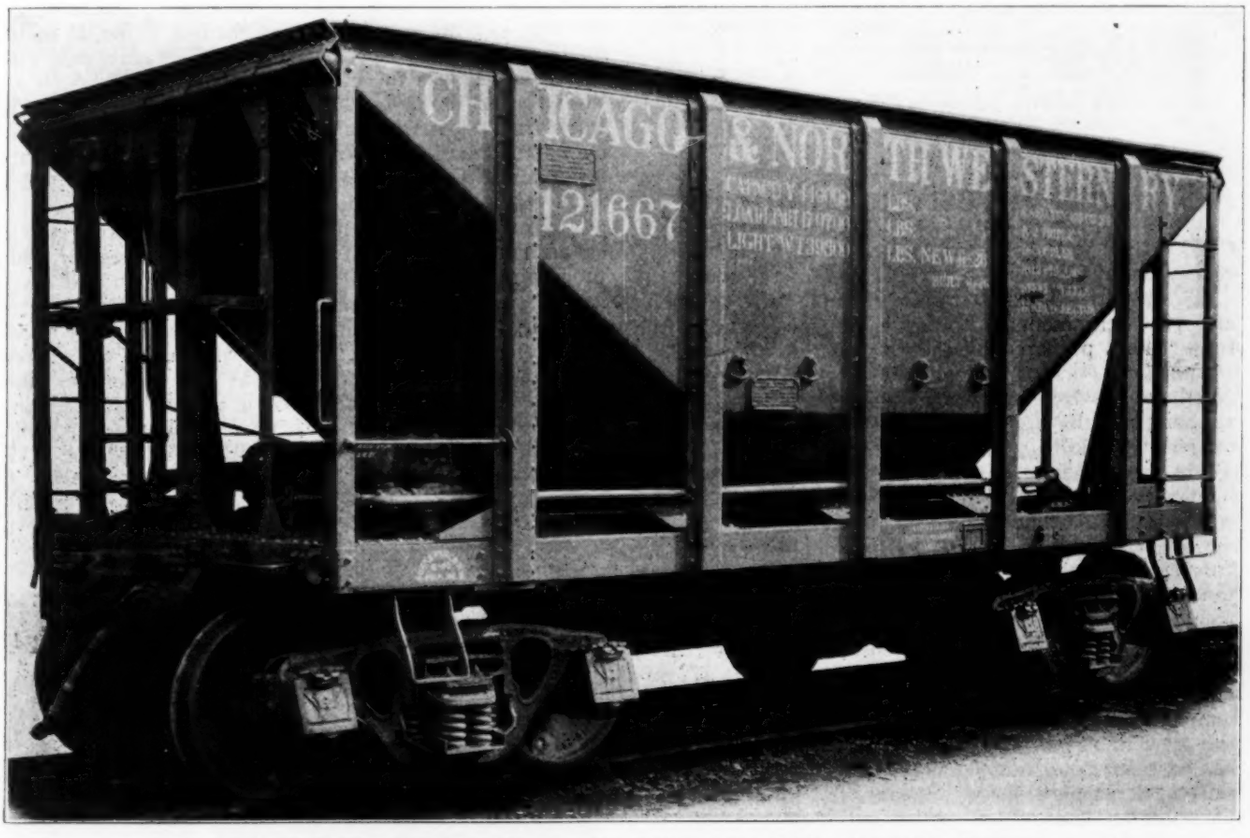
A Cincinnati-Detroit Train on the B. & O. Near Hamilton, O.

C. & N.W. Buys 70-Ton Steel Ore Cars

Absence of continuous center sills provides over 39 sq. ft. clear door opening—975 cu. ft. capacity

THE Chicago & North Western handles a considerable tonnage of iron ore from the upper Michigan fields to lake docks. On account of the high unit weight of this ore steel hopper cars of special design, with a very short wheel base, have been used for a number of years. They have been for the most part of 100,000-lb., 660-cu. ft. capacity. The cars of a new series of 150, now being built by the Pullman Car & Manufacturing Company, have a weight capacity of 140,000 lb. and a cubic capacity of 975 cu. ft.

These cars are self-clearing hoppers arranged for center dumping into ore dock pockets and with a clear opening that does not permit the use of a continuous center sill. It is, therefore, necessary to construct the car so that the pulling and buffing stresses can be transferred from the draft sills to a set of intermediate sills situated outside of the drop doors which form the bottom of the hopper.



C. & N. W. 70-Ton Ore Car—Built by the Pullman Car & Manufacturing Company

The center sills consist of two 15-in., 40-lb. channels extending from the end sills to the center door opening. A 5/8-in. deck plate, to which the upper flanges of the channels are riveted, is reinforced by diagonal struts extending from the connection between the center and end sills to the bolsters at a point opposite the intermediate sill connections. The center sills are cut off and joined to the sloping ends of the hopper by 3-in. angles which are carried up the slope to a junction with the two center end posts, thus forming a double triangular truss at each end of the car.

The deck plate also extends beyond the bolster between the intermediate sills and this portion of the plate is connected to the intermediate sills by means of riveted angles. This plate also forms a convenient platform for mounting the air brake equipment.

The bolsters are pressed diaphragm members riveted to the center sills, side sills and the deck plate. Intermediate sills of 12-in., 30-lb. channels, spaced 5 ft. 3½ in. back to back, extend from bolster to bolster, thus providing for a clear door opening 7 ft. 4 in. long and 5 ft. 4⅝ in. wide. The side sills are 7-in., 15.6-lb. channels extending from end to end of the car. Diaphragms of pressed steel with ½-in. cover plates connect the intermediate side posts. Gusset plates are used at all corner connections to eliminate torsional stresses as far as possible.

The top rail of the car body is 5 in. by 3½ in. by ⅜ in. bulb angle canted in such a way that no iron ore can become lodged in the top rail or its connections. The side and end sheets and stakes are bent to conform with the canting of the top rail.

The trucks are of the Dalman-Chiles design and they are fitted with Woods gravity side bearings and the

Barber lateral motion device. Other truck specialties include Thornburgh dust guards, Magnus bearings and Asco journal box lids. Davis four-point brake beam supports and Schaeffer bottom lever connections are included in the truck construction. One hundred cars are equipped with 33-in. rolled steel wheels and 50 cars with Davis cast steel wheels of the same size.

The brake equipment includes Westinghouse Schedule KD 1012, Miner ideal hand brake ratchet and a foundation gear arranged so that only the truck levers are below the level of the car sills.

A.R.A. Type D couplers with cast steel yokes are used on all of these cars. Fifty cars are equipped with Miner A 69X, fifty with Cardwell G11AA, and fifty with Waugh-Davidson draft gears.

The principal dimensions of these cars are as follows:

Capacity	{ 70 tons / 975 cu. ft.
Lengths:	
Inside at top	21 ft. 2½ in.
Over striking castings	21 ft. 6½ in.
Between pulling faces	24 ft. 1 in.
Between bolster centers	15 ft. 0 in.
Over sills	21 ft. 3 in.
Door opening	7 ft. 4 in.
Width:	
Inside	8 ft. 11½ in.
Over side channels	9 ft. 0 in.
Overall	9 ft. 4 in.
Height:	
Maximum	10 ft. 6½ in.
Rail to side sill	3 ft. 8 in.
Side bearing centers	4 ft. 4 in.
Truck wheel base	5 ft. 0 in.
Light weight	39,300 lb.
Ratio of light weight to revenue load	1:3.56

Accidents Investigated in July*

THE Bureau of Safety of the Interstate Commerce Commission investigated in the month of July, 1926, four train accidents; two collisions and two derailments. Following are abstracts of the four reports prepared by the Bureau:

Canadian Pacific, Sutton, Vt., July 9, 9:15 p. m.—North bound freight train No. 903 was derailed at a washout and the fireman of the second of its two locomotives was killed; one other employee was injured. There was a heavy rain and the blocking of a culvert by floodwood appears to have been the cause of the washout. No blame is placed on any person.

Gulf, Colorado & Santa Fe, Heidenheimer, Texas, July 15, 2:50 a. m.—Southbound passenger train No. 17 ran over a misplaced switch and into the head of a freight train standing on the side track, overturning both locomotives and one baggage car, and wrecking several freight cars. The engineman of No. 17 was killed and 30 passengers, one employee and three Pullman porters were injured. The weather was clear and the view unobstructed; but the passenger train, having run past two automatic signals set at caution, entered the side track at high speed, some of the estimates being 65 miles an hour.

The freight had been standing on the side track for some time and had been passed by a northbound passenger train; and after the passage of this train, an inexperienced brakeman went forward and set the switch for the side track, acting on his own initiative. The freight conductor was engaged in cooling some hot journals and the engineman was at work on his engine, and no one discovered the brakeman's error until the passenger train was too near to be stopped. This brakeman is 21 years of age and had been in the service only ten days, with no previous railroad experience. He had a copy of the time table but did not have a watch. He knew that a meet order had been received by the engineman but knew nothing of its contents. The fireman of the freight was also inexperienced, this being his first trip as a regular fireman. The light of the misplaced switch was not burning, and the first that the fireman of No. 17 noticed anything wrong was the red target of this switch, as seen by the light of his headlight. The lamp tender testified that the light had been burning properly on the evening before.

The inspector puts the responsibility on the freight brakeman but also says that the engineman of No. 17 failed to observe the automatic block signals. The two automatic signals north of this switch display caution when the switch is set for the siding; the inspector says that better protection would be provided if the signal nearest the switch were to indicate stop.

Louisville & Nashville, Canton, Ga., July 15.—Northbound passenger train No. 4, moving at about 30 or 35 miles an hour was derailed on a curve of 13 degrees; and one car fell down a bank. The engineman and fireman were killed and seven other persons were injured. The cause of the derailment was not definitely ascertained, nothing wrong being found in the track, the locomotive or the cars. The superelevation of the outer rail was 4.75 in., nominally the right height for 23 miles an hour, but the inspector does not feel sure that excessive speed was the cause of the derailment.

Baltimore & Ohio, Deer Park, Md., July 26.—A work train moving very slowly westward was run into by a westbound extra freight, moving at from five to ten miles an hour; and a track laborer was killed. Two other employees were injured. The work train was engaged in loading rails, having occupied the main track on an oral permit from the block signal operator, the time being limited to 20 minutes; and had moved eastward against the current of traffic without written authority. The inspector calls for the correction of bad practice in a number of features, the freight train having been traveling faster than was safe under the caution signal which had admitted it to the block section. Had the engineman of this train been operating his train under proper control the collision would not have occurred.

* For preceding investigations see *Railway Age,* November 13, August 28, August 14 and July 10.

The Master in Chancery (Left) and the Successful Bidders, D. C. Swatland (Center) and R. T. Swaine (Right) at the Sale of the St. Paul

Public Relations Work as a Part of Railroad Management

What has been and should be done to create an understanding and friendly sentiment discussed

"PUBLIC Relations Work as a Part of Railroad Management" was the subject of a discussion at the meeting of the Western Society of Engineers in Chicago on November 29. A paper was read by Samuel O. Dunn, editor of the *Railway Age,* and was commented upon by a number of railway officers and others present. "The remarkable progress that has been made within recent years in improving railway service and at the same time rehabilitating railway earnings and credit, and the means by which this progress has been accomplished," Mr. Dunn said, "probably afford the finest example in the history of this country of the way in which large corporate interests, their employees and the people they serve can so co-operate as to promote the legitimate interests of all of them.

"It has long been assumed in public discussion and government action that there is an 'irrepressible conflict' between the interests of big aggregations of corporate capital and the welfare of their employees and customers. Our railway experience in the last three years has shown there need be no such conflict if managers of large corporations will recognize the fact that they are trustees, not only for their stockholders, but also for their employees and the public, and if they, their employees and the public will avail themselves of means readily available for co-operating together."

Mr. Dunn contrasted past conditions with those of the present, saying that twenty years ago the railroads were enjoying the greatest prosperity they have ever known, but at the same time they were also experiencing the greatest unpopularity they have ever known. "In almost every state, almost all the politicians and newspapers were in full cry against the railways and advocating 57 varieties of regulation. All classes of shippers were in a rage because of the existence of a nation-wide car shortage. At this time new railroad laws were going into effect, and the passage of hundreds of others was imminent but most railway executives had nothing to say.

"The storm of public sentiment broke and poured a deluge of regulating laws and orders upon the railroads. The railways continued to be comparatively prosperous until 1910, when a general advance in wages and prices began and the railways were unable to get a general advance in rates because Congress passed the Mann-Elkins Act empowering the Interstate Commerce Commission, first, to suspend, and after hearings to forbid, advances in rates. Railroad development began rapidly to decline.

Beginning of "Public Relations" Work

"With this decline the more open-minded railway executives began to see that new methods of dealing with the public must be adopted if private ownership was not to be destroyed. In 1910 the railways established the Bureau of Railway Economics in Washington 'for the scientific study of railroad problems.' This was the first step taken by the railways to compile and broadcast the actual facts about their business for the purpose of influencing public opinion. Soon the Railway Executives' Advisory Committee, now the Association of Railway Executives, was formed, representing practically all the railways. It was brought into existence chiefly to try to secure improvements in the federal legislation under which the railways were regulated and drew up a program for presentation to Congress. Some railway executives began to make addresses and public statements replying to criticisms of the railways, defending their management and advocating changes in regulation. Some even began to put public relations officers on their staffs. Then this country entered the war, and soon government operation was adopted.

"After the war the public demanded the return of the railways to private ownership. A more constructive policy of regulation was provided for by the Transportation Act. The railways had been awakening to the necessity for public relations work before the adoption of government control. It was now soon brought home to them with greatly multiplied force that private management must either go down or meet squarely in the public forum its assailants and defeat them. They began to defend themselves as never before. The principal defensive weapons used have been of two kinds—improved service and publicity."

Mr. Dunn reviewed the means that have been used to improve railway service, the results that have been secured, and the extraordinary effects upon the economic conditions of the country that have been produced.

"Finding that they can get freight moved with unprecedented reliability and speed," he said, "business concerns of all kinds have reduced their inventories by an aggregate of many billions of dollars and are depending on 'hand-to-mouth buying' to supply their current and future needs. This reduction of inventories has released a corresponding amount of capital for other uses and doubtless is the main reason why, in spite of the great business activity of the last two years, the country's financial institutions still can meet all the demands upon them at low rates of interest.

"The very best and most effective public relations work that any concern or industry can do, is by giving the public good service and constantly striving to improve it. But, if the railways had only improved their service there would have been no such change in public sentiment as has occurred. There was something else they had to do. They had to explain and defend themselves. They had long been under attack; and they were never subjected to a more dangerous attack than in the years immediately following their return to private operation.

Railways Between Two Fires

"They were caught between two fires. From one direction they were assailed by their patrons, and especially by agrarian politicians and spokesmen of farmers' organizations, upon the ground that their rates were excessive. A general reduction of rates, which was especially large upon grain and grain products, was made in

1922, but the denunciations of freight rates on farm products continued. Never since the granger days of the seventies had the western farmers manifested such bitterness about freight rates.

"From another direction the railways were assailed by the labor unions composed of their own employees. Beginning in 1916 with the passage of the Adamson Act, hours of work had been reduced and wages had been advanced until the increases far exceeded the increase in the cost of living. While the shippers were demanding reductions of rates the railways were demanding reductions of wages which, of course, the labor unions resisted. The labor leaders almost unanimously advocated the Plumb Plan of government ownership as the only solution of the railroad problem.

"The belligerent farmers did not find the Plumb Plan acceptable, although many of their radical leaders did; but the labor leaders succeeded in uniting those who wanted higher wages and those who wanted lower rates for an attack upon the railways which, if successful, would have been fatal to private ownership. Section 15-A of the Transportation Act directs the Interstate Commerce Commission, first, to determine from time to time what is a fair return for the railways to earn, having regard to the need of the country for adequate development of its transportation facilities, and secondly, to so adjust rates that they will be able to earn this return. Excepting for the reference to the nation's need for adequate development of its transportation facilities these provisions merely direct the commission to do what the Supreme Court of the United States repeatedly has held the Federal constitution requires to be done by every government body that regulates the rates of a railroad or public utility. Nevertheless, Section 15-A and its administration by the commission were bitterly attacked upon identical grounds by those who were seeking higher wages and those who were seeking lower rates.

"It was claimed they guaranteed a fixed return to the railways, although the words as nearly as may be in Section 15-A explicitly recognized that the return earned in different years would vary and although there was no provision for compensation for any shortage in the return earned. The commission placed upon the railways a tentative valuation as of December 31, 1919, for rate making purposes, of $18,900,000,000, which it stated was based upon information it had gathered in carrying out the La Follette valuation law passed in 1913. This law expressly directed it to ascertain the cost of construction, the cost of reproduction and all other elements of value. The tentative valuation was about two billion dollars less than the book cost of road and equipment. Nevertheless, it was claimed that it was seven billion dollars too large.

"The reason why those who wanted higher wages and those who wanted lower rates were able to join forces in an attack upon the valuation of the railroads is obvious. A reduction of seven billion dollars in the valuation would reduce by 400 million dollars annually the net return which the railways would be allowed to earn. The farmers believed they would get a large part of this in lower rates. Railway employees believed they would get a large part of it in higher wages. The advocates of government ownership in both camps apparently foresaw that such a curtailment of the net return of the railways would bankrupt them, make a continuance of private management impossible and bring about government ownership. The radical labor leaders really nominated Senator La Follette for president in 1924. They said little specifically about the Plumb Plan in the political campaign, but their objective was plainly shown by the declaration made in Senator La Follette's platform for government ownership and 'democratic operation' of railways.

"The railways countered these attacks both in co-operation and individually. Their co-operative work was divided among different organizations. The Association of Railway Executives was left in charge of all activities in Washington, D. C., pertaining to federal railway legislation, these consisting principally of the presentation of evidence and arguments before committees of Congress. There were formed two territorial committees of railway chief executives—the Eastern Railways' Committee on Public Relations, representing the eastern and southern lines, and the Western Railways' Committee on Public Relations, representing the western lines. It became the function of these committees to disseminate information and discussions regarding the railway situation as a whole, and especially in their particular territories, the situation in different parts of the country not always being the same.

Talking to the Farmers

"One of the most significant things done by the western committee was to carry on a public relations advertising campaign in farm papers throughout its territory having an aggregate of almost 4,500,000 subscribers. Federal regulation of railways always had been shaped mainly by western sentiment. This had been principally the sentiment of farmers. The western farmers were angry because freight rates had gone up in 1920 just as their prices were beginning to fall, and were having their anger fanned into fury against the railways and the Transportation Act by men who told them that freight rates were high because the railways had secured passage of the Transportation Act and by this means got an excessive valuation put on their properties and a 'guarantee' of an excessive return on this valuation.

"The information put into the advertisements in the farm papers set forth the increases in wages, taxes and other railway costs that had made necessary higher rates; explained the provisions and actual working of the Transportation Act, thereby destroying the myth of a 'guarantee' of net return; attempted to show why the tentative valuation made by the Interstate Commerce Commission was not excessive; pointed out why good railway service was more valuable to the farmers than rates so low they would cripple service; attacked the Plumb Plan, and so on. The material put into these advertisements was typical of that distributed through public addresses, magazine articles, open letters and newspaper interviews to the public in general by both the territorial committees of railway executives.

"The railways have continued since then, through their territorial committees of executives and the organizations of individual lines, widely to disseminate information conducive to a good public understanding of rates, operating problems, improvements in properties and service, and financial results. They have used advertising and public discussion to combat proposed changes in regulation that would have subjected it to political influence or rendered it impossible for the roads to earn the so-called 'fair return.' There can be no doubt that their activities of this kind have been hardly less influential than the improvements that have been made in freight service in creating the prevailing favorable sentiment.

A Lesson of Importance

"There is a lesson of great importance in the experience of railways for all the industrial, commercial and financial interests of the United States. An increasing

part of the business of the country is being done by large corporations. The growing size of these corporations inevitably tends to increase the public's suspicion and fear of them and to cause it to demand more forms of government interference with them. If adoption of more and more radical and even socialistic measures in dealing with aggregations of corporate wealth is to be avoided, the managers of large concerns must have more public relations work done for two purposes. The first of these is to keep themselves informed about public sentiment and the conditions and influences that from day to day are creating it. They must keep themselves thus informed if they are to adopt policies that can be successfully defended. The second purpose for which more public relations work must be done is to present to the public information and arguments which will convince it that the policies followed by large corporate interests are honest and economically sound, if they actually are so. Unfortunately many important financiers who have great influence in large corporate affairs do not yet realize the importance of public sentiment as a factor in determining the development and ultimate fate of a regime of economic capitalism and political democracy. Therein lies a real danger to the future of that regime in this country."

Importance of Employees' Attitude

Among those who participated in the discussion following Mr. Dunn's address were Hal S. Ray, director of personnel and public relations of the Chicago, Rock Island & Pacific; G. M. Crowson, assistant to the vice-president of the Illinois Central; J. D'Esposito, chief engineer of the Chicago Union Station Company; K. E. Kellenberger, representative of the Union Switch & Signal Company; and A. P. Allen, commercial engineer of the Illinois Bell Telephone Company.

Mr. Ray said that the big thing that has been accomplished has been to create in the public mind a sense of confidence in the men who are today trying to do the job of running the railroads. He said he feared overconfidence on the part of the railroads, and warned that the situation now needs attention, as there is a new generation turned loose on the world in our citizenship every day, and there are new politicians who are ready to take advantage of every opportunity to advance their own interests. He suggested that the executives of the railroads, whose names are before the public eye, should frequently go through their territories and meet with the business men and farmers in those communities and let them find out that the men operating the railroads today are just human beings. The best piece of public relations work that can be done, he said, is to enlist the co-operation of every employee, no matter whether his position be high or humble, to treat the public with courtesy and a sincere desire to serve.

Mr. Crowson, in commenting on the subject of having the matter of public relations work handled by men who specialize in it, agreed that such work should be handled by men who have made a study of it and men who have specialized in it, but felt that public relations work is not any one man's job. One of the things that has been responsible for bringing about the improved relations of the railroads and the public has been the vigor and earnestness with which the railroads generally, their officers and employees, have entered into the spirit of the new order of things. He referred to the changed character of public relations work, saying that it was only a few years since the railroads were engaged in defending themselves from attacks, denying false charges and repudiating misstatements. Now the need for that sort of work has very largely disappeared. Public relations work today is of a constructive rather than a defensive character. The railroads have improved their public standing, and it is up to those who represent them to guarantee that the improvement will be continued.

Mr. Kellenberger referred to his contact with railroad employees and his observations of their attitude and the reaction of the public. He said he believed that all the publicity in the world, unless a railway company has the active, full, whole-hearted interest of its employees, is going to be of little benefit. As an example, he cited the ticket window or the freight office where the attitude of the employees impresses the public favorably or unfavorably.

Mr. Allen stated that the railroad problem is about the same as the telephone company's and possibly the same as the gas company's and the electric light company's. He said that every employee must be educated to be a booster for the company and to try to give the best service he knows how. Employees should be kept fully informed as to what they are supposed to do and should be kept in the right state of mind so that they will do it in the right way. He paralleled the telephone business with that of the railway, saying that when the telephone business first started it was met with a brass band because everybody wanted the service. The second stage consisted of consolidation and reorganization. In the third stage telephone companies are beginning to realize that their chief job is to give service. In making rates, he said, the companies have no trouble in any town where good service is given.

Mr. D'Esposito urged that more attention be given to the convenience of patrons, and that employees be taught to think whether their actions will please, accommodate or render a service to the individual who pays, rather than in terms of whether the action is economical for the railroad. With the convenience of patrons in mind, he said, he designed a ticket office in the union station in Chicago in which all the windows were wide open so that the people could look inside and see that nobody was loafing when they wanted to buy their tickets. As another means of insuring convenience for patrons of this station, red caps must carry baggage whether or not the person in the station looks as if he would pay for the service.

Annual Meeting, Short Line Association

WASHINGTON, D. C.

PROPOSED railway legislation in Congress, particularly the proposed amendments of the consolidation provisions of the transportation act, was the chief topic of discussion at the annual meeting of the American Short Line Railroad Association held at Washington on December 8 and 9, which was reported in part in last week's issue. Several resolutions were adopted expressing the position of the association with relation to legislation, but as to the consolidation bills and one or two others the position taken by officers of the association before the committees of Congress was approved and they were given authority to act so as to be able to speak with reference to amendments which may be proposed.

Ben B. Cain, general counsel of the association, described the progress that had been made in hearings before the Senate and House committees and the difference between the Cummins and the Parker bills. He said that while the officers of the association had approved many

of the provisions of the Cummins bill, it is probable that it would be amended before being further considered and that the Parker bill now contains provisions which meet the desires of the short lines that they be given an opportunity to be considered as parts of any proposed consolidation. He said the Parker bill is one of the most constructive bills he had ever seen and urged the members to call on their representatives in Congress to urge its passage. He pointed out that while some progress toward consolidation has been made under the provisions of the law by which the commission may authorize acquisitions of control, the big roads cannot enter into real consolidations without new legislation, and that it is therefore to the interest of the short lines to help in the promotion of legislation to make consolidation possible. President Bird M. Robinson also discussed the situation, saying that a large proportion of the executives of the big roads now recognize that no consolidation legislation can be passed which does not make provision for the inclusion of the short and weak lines and that the commission will not approve consolidations which do not include such lines in the territory involved that are actually needed for the service of the public.

Resolutions were adopted by the association as follows:

Urging Congress to provide by law that the valuation proceedings of Class II and Class III carriers be held in abeyance until the valuation of Class I carriers is completed, to the end that the smaller companies which are least able to protect their respective interests may be enabled to benefit by the final determination of the underlying principles of valuaton by the Supreme Court.

Recommending that legislation be enacted to confer jurisdiction upon the Interstate Commerce Commission over coastwise water-borne traffic passing through the Panama Canal.

Disapproving the efforts to eliminate the Pullman surcharge and endorsing in principle "the proposition that passenger service should bear its proper share of the cost of maintaining railways in efficient operation and that the burden of passenger transportation cost should not be shifted to the shoulders of the freight rate-payers."

Requesting the officers of the association to take under consideration the activities of persons seeking to collect excessive damages for alleged personal injuries to employees and to develop information for a report at the next meeting with recommendations for coping with the situation.

A resolution was referred to the executive committee endorsing the principle that is involved in the St. Louis & O'Fallon case before the Interstate Commerce Commission "that separate short line railroads having no physical connection but which are owned and controlled by the same interests and operated by substantially the same staff of officers should be treated as constituting a single system for the purpose of consolidating the financial returns of such separate railroads operated as such a system under section 15a." The officers of the association were directed to take this position before the commission and before Congress whenever, in their judgment, the opportunity is favorable for advancing this principle.

Another resolution adopted stated that "the association continues to occupy a strong position and constantly growing prestige before Congress, the Interstate Commerce Commission, the state commissions and among the railway organizations of the United States"; that "the short lines, as a class, are receiving a degree of recognition and understanding and more sympathetic treatment which was formerly unknown." Therefore a vote of thanks was extended "to the officers, the executive board, the employees and those individual members which have given so freely of their time and service upon occasion, for their devoted, loyal and effective services for the past year and previous years" and the management of the association was commended "upon the work done and the excellent results achieved."

E. G. Buckland, vice-president of the New York, New Haven & Hartford, addressed the meeting briefly on the subject of the bill pending in the Senate to refund railway indebtedness to the government at a reduced rate of interest. He said the New Haven is made up of 160 short line railroads and that the short lines are just as much a part of the transportation system of the country as the others, most of which began as short lines. There is coming over the thinking men of the country, he said, a profound conviction that the transportation system of the country must be supported as a whole and that each part of it is entitled to a fair return. Regarding the refunding bill he said that of course the indebtedness to the government must be paid, but because of the manner in which it was incurred it is not right that the government should derive a profit from the interest collected from the roads and that if the rate were reduced to 4¼ per cent the difference of 1¾ per cent applied to the amortization of the debt would pay it off in 30 years.

There was a good deal of discussion at the meeting of the Pittman bill to exempt from the recapture provisions of the law roads of less than 200 miles of first main track and having annual revenues of less than $10,000 per mile, and in addition, to the extent to be determined by the commission, roads which are deemed to have a probable limited service life. It was pointed out that although most short lines have no occasion to be worried about the recapture law a number of them are because of special conditions that have given them large earnings over a short period of time, which, under the law, could not be saved to meet "leaner" years. Arrangements were made for a delegation to appear at a hearing on the bill on December 14 before the Senate committee on interstate commerce.

President Robinson and other officers of the association were re-elected.

At the annual dinner on the evening of December 8 Alfred P. Thom, general counsel of the Association of Railway Executives, discussed proposed consolidation legislation and the need of an amendment to the present law to make it workable. He said that the policy of consolidation is based on the desirability of having transportation over the long distances that are involved in this country conducted by large units that can maintain supervision over the transportation and conduct it in the most efficient way. As to the question of including the short lines he said that the bills now pending in Congress provide for giving the commission authority to decide what railroads shall be included or excluded and that in his opinion the commission should have full discretion to consider the entire situation in this way. Richard V. Taylor, of the Interstate Commerce Commission, discussed some of the experiences of his many years in railroad service and the high quality of service rendered by railroad men. He also expressed the opinion that the abandonment of a railroad once located where any considerable number of people have become dependent upon it should be considered with the greatest care and should be permitted only in extreme circumstances. Key Pittman, Senator from Nevada, told of his interest in the problems of the short lines and outlined a bill he had introduced at the request of representatives of short lines in the far West to exempt from recapture the earnings of short lines earning less than $10,000 per mile per year.

A Settlement in the Peace River Country

Western Outlet for Peace River Valley Impracticable

Investigation shows present and future traffic would not pay operating costs of new line

ANY direct rail route to Pacific coast ports from the Peace river district in Canada would not be economically feasible, under existing conditions and freight rates, with the present traffic or with traffic which is likely to be developed for many years to come, according to a report made by a board of engineers consisting of J. G. Sullivan, consulting engineer of the Canadian Pacific; C. S. Gzowski, chief engineer of construction of the Canadian National; J. M. R. Fairbairn, chief engineer of the Canadian Pacific; W. A. James, assistant chief engineer of the Canadian Pacific, and E. N. M. Hill, exploration and locating engineer of the Canadian National. The study of more direct routes was made by the Canadian National and the Canadian Pacific because of the general opinion of settlers in the Peace river district that if a shorter railway were built to the Pacific coast, they would be entitled to and would obtain, lower freight rates. The study was made from the standpoint of the Canadian people and not that of the Canadian National or the Canadian Pacific.

The board established several alternative routes to the Pacific coast, and determined the amount of money necessary to construct the required additional mileage on each route, the operating costs and revenues resulting from the various traffic densities and the fixed charges. The most favorable of these possible routes was then compared with the present route via Edmonton, Alta., fixed charges, operating expenses and revenues being considered. The fixed charges cover only the interest on the cost of new lines and do not include any other fixed charges on lines already constructed.

A route via Obed, Alta., was found to be the least expensive western outlet to the Pacific coast from a national standpoint or from the standpoint of the Canadian National although it may not be the most desirable from the standpoint of the Canadian Pacific as it implies using part of the Canadian National lines. The minimum immediate outlay for this line would be $13,336,000, while it will require a minimum outlay of over $80,000,000 to develop the section fully, not including any betterments on existing lines. There is no hope, even with the existing freight rate of about 39 cents per 100 lb., that the line will pay operating expenses alone on the immediate traffic or on traffic many times the present traffic. The board expressed little hope of the line ever being self-supporting at rates even 50 per cent higher than the present rate on grain to Fort William, Ont., for a similar distance.

Four Possible Routes Discussed

The four possible routes discussed were:

(1) From Aggie, Alta., on the Edmonton, Dunvegan & British Columbia via Sturgeon Lake to Obed on the Canadian National and thence via the latter road to Vancouver, B. C., and Prince Rupert.

(2) From Wembley, Alta., on the Edmonton, Dunvegan & British Columbia by way of the Red Willow, Contrary, Murray and Cariboo river valleys to Monkman Pass and thence to Aleza Lake, B. C., east to Prince George on the Canadian National.

(3) From Spirit River, Alta., and Berwyn via Peace Pass, Prince George to Prince Rupert and Vancouver.

(4) From Spirit River and Grande Prairie via Findlay Forks, B. C., to Stewart.

Cost of Route No. 1 Would Be Least

In laying out the first route both minimum and maximum traffic were considered. For assumed minimum traffic the line would leave the Edmonton, Dunvegan & British Columbia at Aggie, run in a general southwesterly direction for 52 miles to Sturgeon Lake, thence southeasterly in the valley of the Little Smoky river and

Isogum creek to a low summit between it and the Athabaska river, and thence in a general southwesterly direction in the valley of the Athabaska river to Obed, a distance of 152 miles, making in all approximately 204 miles of new line necessary to connect the Edmonton, Dunvegan & British Columbia with the Canadian National. The construction would require a capital investment of $13,336,000 to Vancouver and $13,356,000 to Prince Rupert for minimum traffic. The gradients against outbound traffic to Vancouver or Prince Rupert would be 5 per cent. The average distance traffic would be hauled to Vancouver would be 905 miles and to Prince Rupert 1,095 miles. The net outgoing tonnage to Vancouver or Prince Rupert would be 150,000 tons.

To handle the assumed maximum traffic an additional 60 miles of line would be required from Sturgeon Lake westerly to Grande Prairie, besides the local branch lines necessary for securing traffic, making in all a total of 1,004 miles to be constructed. The capital investment required to Vancouver for maximum traffic would be $80,484,500 and to Prince Rupert $80,819,500. The gradients against outbound traffic to both cities would be 0.5 per cent. The average distance traffic is hauled to Vancouver would be 909 miles and to Prince Rupert 1,100 miles. The net outgoing tonnage to Vancouver or Prince Rupert would be 1,860,000 tons.

Three other routes from the Peace river country to connect with the Canadian National east of the Rocky Mountains were suggested as alternatives. One was from Grande Prairie via the Hoppe coal fields to Brule, another from Sturgeon Lake to Brule and the third from Sturgeon Lake to Edson.

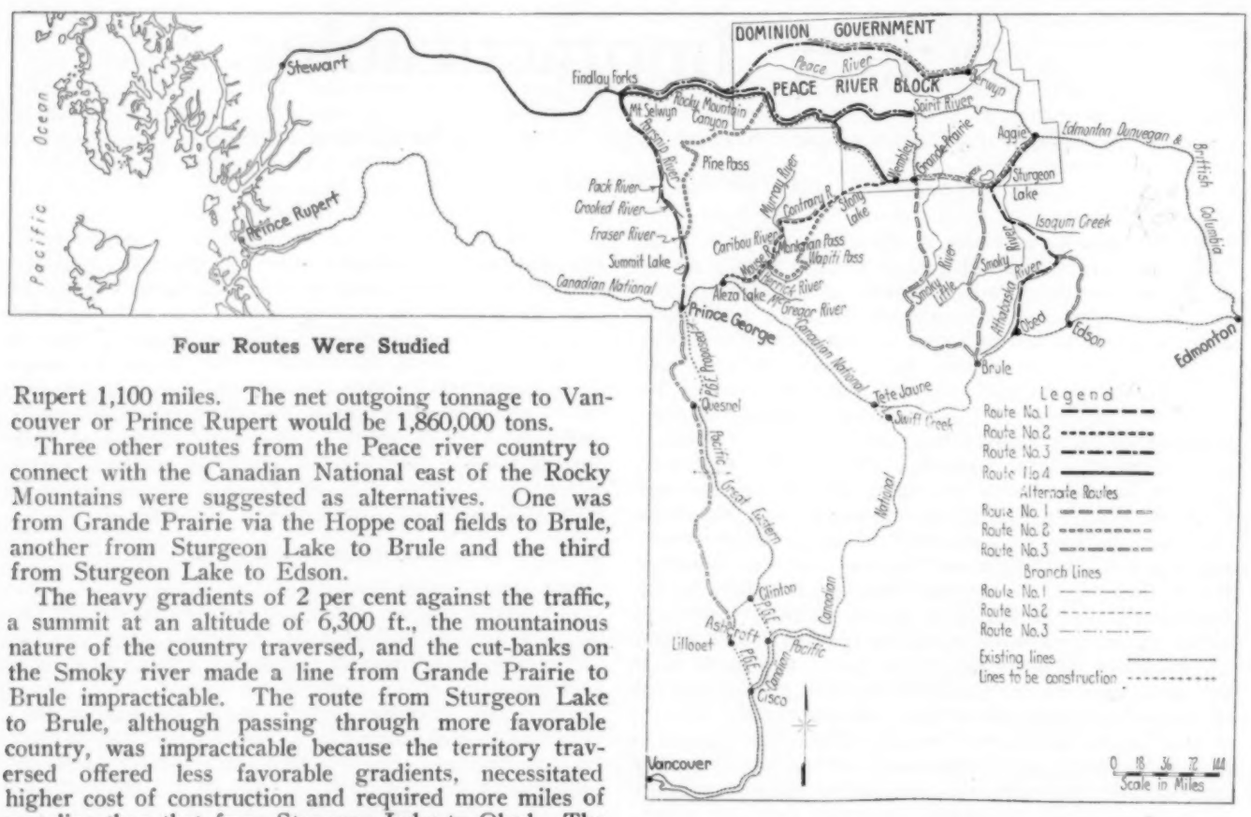
The heavy gradients of 2 per cent against the traffic, a summit at an altitude of 6,300 ft., the mountainous nature of the country traversed, and the cut-banks on the Smoky river made a line from Grande Prairie to Brule impracticable. The route from Sturgeon Lake to Brule, although passing through more favorable country, was impracticable because the territory traversed offered less favorable gradients, necessitated higher cost of construction and required more miles of new line than that from Sturgeon Lake to Obed. The gradients, mileage and construction costs of a line from Sturgeon Lake to Edson would be practically the same as from Sturgeon Lake to Obed, but westward traffic, would have to be hauled 36 miles further.

Route 2 Has Lowest Pass But Construction Costs More Than Route 1

This route would leave the Edmonton, Dunvegan & British Columbia at Wembley and run in a southwesterly direction to the valley of the Red Willow river to Stony Lake, 65 miles, and thence southwesterly in the valley of the Contrary river to the Murray river, 30 miles, and thence south in the valleys of the Murray and Cariboo rivers to the Monkman Pass, 30 miles. From here it would run southwesterly in the valleys of the Moose, Herrick and McGregor rivers to Aleza Lake on the Canadian National, 63 miles The construction, capital investment, gradients, average distance traffic would be hauled and the net outgoing tonnage are compared as follows:

	For Assumed Initial Traffic	For Assumed Maximum Traffic
New construction via C. N. R. to Prince Rupert	188 miles	1010 miles
New construction via C. N. R. to Vancouver...	198 miles	1020 miles
New construction via P. G. E. to Vancouver...	310 miles	1132 miles
Capital investment via C. N. R. to Price Rupert	$16,092,000	$83,117,500
Capital investment via C. N. R. to Vancouver...	16,642,000	84,349,000
Capital investment via P. G. E. to Vancouver...	21,692,000	90,081,250
Gradients against outbound traffic:		
(1) To Vancouver or Prince Rupert via C. N. R.	0.75 per cent	0.75 per cent
(2) To Vancouver via P. G. E. and C. N. R.	1.00 per cent	1.00 per cent
Average distance traffic is hauled to Prince Rupert	811 miles	873 miles
Average distance traffic is hauled to Vancouver (Via C. N. R.)	915 miles	977 miles
Average distance traffic is hauled to Vancouver (Via P. G. E.)	864 miles	926 miles
Net outgoing tonnage to Vancouver or Prince Rupert	150,000 tons	1,860,000 tons

There are two alternative routes to Vancouver from Aleza Lake for traffic by way of this pass. The first is by way of the Canadian National which would necessitate a short cut-off of some 10 miles from Tete Jaune to Swift Creek. This would average light mountain construction. The second alternative is by way of the Pacific Great Eastern from Prince George with a 42-mile connection to the Canadian National from Clinton to Ashcroft. In addition to this it would be necessary to complete the Pacific Great Eastern for some 80 miles from Prince George to Quesnel. The construction cost of both of these lines would be high, and they traverse a country from which very little traffic would originate in either farm or timber products.



Four Routes Were Studied

As alternatives, two other routes were considered, one by way of Wapiti Pass and another by way of Pine Pass. The Wapiti Pass is some 30 miles southeast of the Monkman Pass. It is approximately 900 ft. higher and a line would be some 20 miles longer without any advantage in gradients or construction costs as compared to the Monkman Pass, for which reasons it has nothing to recommend it as an alternative to the latter route.

The only advantage that the Pine Pass route has over the Peace Pass route is that it would be shorter

Near the End of Present Steel

for traffic originating south of the Peace river. The Monkman Pass is in turn more advantageous than the Pine Pass for this traffic on account of its lesser gradients and distance. Pine Pass is approximately 175 miles from, and nearly due west of Spirit river and approximately 155 miles nearly due north of Prince George.

Route 3 Requires Excessive Construction

To avoid back haul, this route would require two branches; one starting at Spirit river and running westward 165 miles to Rocky Mountain canyon and another from Berwyn to a junction with the first on the south side of Peace river, 200 miles. From Rocky Mountain canyon to Prince George, 257 miles, the line closely parallels the Peace river to Mt. Selwyn. It then follows the Parsnip, the Pack and Crooked river to Summit Lake, after which it runs down the slope of the Fraser river to Prince George, 35 miles.

From Prince George the traffic can be carried to Prince Rupert and to Vancouver by way of existing Canadian National lines, necessitating the building of a 10-mile cut-off between Tete Jaune and Swift Creek. It can also be carried to Vancouver by completing the partially constructed Pacific Great Eastern, a distance of 80 miles, to Quesnel, thence by way of the Pacific Great Eastern to either Clinton or Lillooet. From Clinton a new line would have to be built to Ashcroft, a distance of 40 miles, to connect with either the Canadian National or the Canadian Pacific. From Lillooet a new line would be built to Cisco bridge, a distance of 40 miles, to connect with either the Canadian Pacific or the Canadian National, both railways crossing the Fraser river at this point.

Instead of connecting with the Pacific Great Eastern at Prince George, it is possible to build a line down the valley of the Fraser to a junction with the Canadian Pacific or the Canadian National at Cisco. This would afford gradients of not over 0.4 per cent, but on account of the cut-banks it would be necessary to build the line, in places, in the river channel. But the maximum tonnage assumed does not warrant the construction of another line south of Prince George.

The requirements of this route are shown in the following table:

	For Assumed Initial Traffic	For Assumed Maximum Traffic
New construction via C. N. R. to Prince Rupert	502 miles	1127 miles
New construction via C. N. R. to Vancouver	512 miles	1137 miles
New construction via P. G. E. to Vancouver	542 miles	1167 miles
New construction via Fraser river to Vancouver	850 miles	1475 miles
Capital investment via C. N. R. to Prince Rupert	$24,473,000	$81,432,250
Capital investment via C. N. R. to Vancouver	22,102,000	82,494,750
Capital investment via P. G. E. to Vancouver	27,052,000	88,196,250
Capital investment via Fraser river to Vancouver	48,072,000	110,794,750
Gradients against outgoing traffic:		
via C. N. R. to Prince Rupert	0.4 per cent	0.4 per cent
via C. N. R. to Vancouver	0.4 per cent	0.4 per cent
via P. G. E. to Vancouver	1.00 per cent	1.00 per cent
via Fraser river to Vancouver	0.4 per cent	0.4 per cent
Average distance traffic is hauled:		
via C. N. R. to Prince Rupert	952 miles	930 miles
via C. N. R. to Vancouver	1133 miles	1111 miles
via P. G. E. to Vancouver	983 miles	961 miles
via Fraser river to Vancouver	983 miles	961 miles
Net outgoing tonnage to Vancouver or Prince Rupert	170,000 tons	1,860,000 tons

Note 1. In the routes via P. G. E. to either Clinton or Lillooet, and thence to either Ashcroft or Cisco bridge to connect with either the C. P. R. or C. N. R., the new miles to build, the cost of construction, distance traffic is hauled, and gradient being similar, these routes are indicated simply as via P. G. E.

Note 2. The distance given in statement of initial cost is taken from Spirit river. In statement of maximum cost the line from Berwyn to the junction of these lines at Rocky Mountain canyon has been added.

Cost of Construction of Route 4 Too Large for Traffic

This route would be identical with the Peace river route from Spirit river and Grande Prairie to Findlay Forks, but from the latter point the line would run

In the Timber in the Peace River Territory

through a different territory to Stewart. The requirements of this line are as follows:

	For Assumed Initial Traffic	For Assumed Maximum Traffic
Minimum construction	611 miles	1175 miles
Minimum construction line to Prince George		1347 miles
Capital investment (not including line to Prince George)	$30,370,000	$81,932,250
Capital investment (including line to Prince George)	37,750,000	90,172,250
Gradients	1 per cent	1 per cent
Average distance traffic hauled to Stewart	611 miles	591 miles
Net outgoing tonnage to Stewart	170,000 tons	1,860,000 tons

From the foregoing account it is apparent that Route 1 has all the advantages over the others as regards new construction, capital investment, the gradients against

outbound traffic, the average distance traffic is hauled and the net outgoing tonnage.

Traffic to Be Handled

Before entering into an economic study of the routes it is first necessary to show the amount of traffic to be handled and the branch lines that would have to be constructed.

To determine the amount of grain traffic in sight at the present time the shipments for the years 1919 to 1923 were used. The average per year was 48,934 tons, including 31,969 tons of wheat, 15,888 tons of oats, 924 tons of barley and 153 tons of flax and rye. The portion of the grain traffic which would go to Vancouver could be hauled out in 16 trains over a 4 per cent gradient with a locomotive having 50,000 lb. tractive effort. This is an average of 1⅓ trains per month. An initial outgoing traffic to the Pacific seaboard of 150,000 tons was assumed.

To arrive at a figure for the maximum outgoing traffic, it was assumed that all the first-class and second-class land would be fully developed in 25 years and factors of average production larger than any that experience in any other district in the prairies would justify were applied. A total of 15 per cent for by-products, etc., was added and a figure of 1,860,000 tons was arrived at as the maximum that would be produced, and would go to the Pacific seaboard. For the return traffic from the Pacific seaboard, 5 per cent of the outgoing was assumed.

include the routes by way of Pine Pass, Wapiti Pass, or Brule, in a detailed economic study.

The maximum traffic would require 9,000 new freight cars on all routes except to Stewart, where only 6,000 would be needed. These figures are based on the car-miles developed and the cars were allowed 25 miles per day. The number of new locomotives of 50,000 tractive effort necessary, it was found, would vary with the routes and these were based on the engine-miles required. The smallest number was 75 and the greatest 100. It was assumed that a locomotive would make 24,000 miles per year. The seasonal nature of the business accounts for the low estimate of car and engine annual mileage registered.

The economic studies made of the various routes for a western outlet indicate that the most favorable route to Vancouver is by way of Obed and the Canadian National. All the routes through either Peace, Pine, Monkman or Wapiti passes converge at or near Prince George, and from that point there are four general routes to Vancouver: First, by way of a new low-grade line down the Fraser river from Prince George to a connection with either the Canadian National or the Canadian Pacific; second, by way of the present Pacific Great Eastern from Prince George to Lillooet, and thence by way of a new line down the Fraser river to connect with either the Canadian National or the Canadian Pacific; third, the same as the second, with a cut-off from Clinton to Ashcroft; and fourth, by using

TABLE SHOWING RELATIVE EXTRA ANNUAL COST OF HAULING VARIOUS AMOUNTS OF TRAFFIC FROM PEACE RIVER COUNTRY TO VANCOUVER BY WAY OF THE OBED ROUTE, COMPARED WITH COST OF HAULING BY WAY OF EDMONTON, DUNVEGAN & BRITISH COLUMBIA AND CANADIAN NATIONAL RAILWAY LINES. ALSO SHOWING IN COLUMN 9 THE RATIO OF FIXED CHARGES OBED LINE TO TOTAL RECEIPTS AT RATES OF 39 AND 30 CENTS PER 100 LB.

Amount of Traffic	Tons	Rate per 100 lb.	Total Revenue	Total fixed charges on new capital invested: On Obed Route	On Edmonton Route	Difference in fixed charges in favor Edmonton Route	Extra cost of operating via Edmonton	Saving or loss in operating via Edmonton or via Obed Route	Proportion of total revenue required to pay fixed charges Obed Route
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Present	35,000	39 cents	$273,000	$550,000	$20,000	$530,000	$9,000	$521,000	200 per cent
Initial		39 cents	1,365,000						49 per cent
	175,000			666,800	118,600	548,200	40,663	507,517	
		30 cents	1,050,000						63 per cent
Twice		39 cents	2,730,000						36 per cent
Initial	350,000			980,000	475,000	505,000	85,000	420,000	
		30 cents	2,100,000						47 per cent
Four Times...		39 cents	5,460,000						30 per cent
Initial	700,000			1,645,000	1,175,000	470,000	240,000	230,000	
		30 cents	4,200,000						40 per cent
Eight Times..		39 cents	10,920,000						28 per cent
Initial	1,400,000			2,975,000	2,575,000	400,000	601,000	Loss 201,000	
		30 cents	8,400,000						35 per cent
Maximum		39 cents	15,233,400						26 per cent
	1,953,000			4,024,255	3,680,000	344,255	977,547	Loss 633,322	
		30 cents	11,718,000						34 per cent

In studying the branch lines necessary to handle this traffic no attempt was made to lay down their exact locations definitely. Certain lines are trunk lines for one route and branch lines for another. The Edmonton, Dunvegan & British Columbia was used as an interchange carrier to transport traffic from some branch lines to their trunk lines. Route 1 would require 264 miles of trunk lines and 740 miles of branch lines, or a total of 1,004 miles; Route 2, 198 miles of trunk and 822 miles of branch or a total of 1,029 miles; Route 3, 742 miles of trunk and 425 miles of branch or a total of 1,167 miles; and Route 4, 750 miles of trunk and 425 miles of branch or a total of 1,175 miles.

Comparison of Routes Favors No. 1

Because of the lower summit, easier gradients and shorter distance, the Monkman Pass route is far better than either the Pine or Wapiti passes. For the same reasons, the Obed route is far superior to that by way of Brule. Therefore, it was deemed unnecessary to

the present Canadian National from Prince George to Vancouver and by building a 10-mile connection from Tete Jaune to Swift Creek.

The distance by way of the first, second and third routes would be practically the same. The distance by way of the Canadian National route is the longest, but the economic studies show it to be the most favorable route in this group, because of the favorable gradients as compared with those on the second and third routes. The economic disadvantage of the first route, although it has the most favorable gradients, is the interest charges on the large amount of capital required to pay the cost of constructing such a line.

A comparison of the lines by way of Monkman Pass and the Pacific Great Eastern to Vancouver, with a line via Peace River Pass and the Pacific Great Eastern to Vancouver, indicates that for the maximum traffic assumed there would be a small difference in favor of the Peace River Pass line. However, the large expenditure assumed for initial traffic by way of Peace River Pass

makes the line by way of the Monkman Pass more favorable.

An accompanying table indicates that when the initial traffic is developed to an amount eight times as large the construction of Route 1 would be justified. The latter amount would be 30 times the present average. The figures for initial and maximum traffic are from direct computations. The figures for the amounts of traffic between the initial and maximum as shown in columns 4, 5 and 7 are interpolated. Those in columns 4 and 5 were interpolated with the thought that the rate of new construction on the Obed route would not be as rapid at first as on a route where no new construction is contemplated at present. In interpolating the figures in column 7 consideration was given the extra cost per ton for the initial traffic.

Best Route Shows Large Deficit

The financial result discussed is the difference between the annual receipts and the expenditures. The least capital outlay for the minimum traffic assumed is on the Obed route and amounts to $13,336,000, imposing a fixed charge of $666,800 at the rate of 5 per cent. This will have to be earned out of freight traffic which would be 157,000 net tons moved an average distance of 905 miles, or 142,537,500 net ton-miles, with a density of 429 net ton-miles per mile per day. With this small density it cannot be expected that operating costs can be kept very low. If the proposed line is to benefit the producer materially, the rate cannot be much higher than 0.661 cents per ton-mile. On the basis of prairie rates to Vancouver it would be about 0.54 cents per ton-mile. As all of these rates will be less than operating costs there is bound to be an operating loss, in addition to the burden of fixed charges on the initial traffic, which is 0.467 cents per net ton-mile. Below is given the annual loss for the initial traffic under different conditions:

Per Net Ton-Mile			Annual		Total
Revenue	Operating Costs	Operating Loss	Operating Loss	Fixed Charge	Annual Loss
0.66 cents	0.85 cents	0.19 cents	$270,821	$666,800	$937,621
0.54 cents	0.85 cents	0.31 cents	441,866	666,800	1,108,666
0.50 cents	0.85 cents	0.35 cents	498,881	666,800	1,165,681
0.66 cents	0.83 cents	0.17 cents	242,314	666,800	909,114
0.54 cents	0.83 cents	0.29 cents	413,359	666,800	1,080,159
0.50 cents	0.83 cents	0.33 cents	470,374	666,800	1,137,174
0.66 cents	0.75 cents	0.09 cents	128,284	666,800	795,084
0.54 cents	0.75 cents	0.21 cents	299,329	666,800	966,129
0.50 cents	0.75 cents	0.25 cents	356,344	666,800	1,023,144

For the maximum traffic assumed and using the Obed route, the capital outlay is $80,484,500, making fixed charges of $4,024,225. There would be 1,953,000 net tons moved an average of 909 miles or 1,775,277,000 net ton-miles annually, producing an average density of 3,020 net ton-miles per mile daily. This is about equal to that of the Canadian Pacific. To pay the fixed charge, 0.227 cents per net ton-mile would have to be earned in operation. This means that the fixed charges of 0.227 cents per ton-mile will have to be deducted from the revenue per ton-mile.

If by the time the maximum traffic is reached, rates are increased so that they will pay the cost of service, including fixed charges, the amount necessary to carry the intermediate deficit would be $8,718,824. This is based on the assumption that the immediate loss would not exceed $1,000,000 for the first year and will be eliminated within a period of 25 years.

BITUMINOUS COAL PRODUCTION broke another record in the week ended December 4, when the output as estimated by the Bureau of Mines was 14,728,000 net tons. This represents a sharp recovery from the preceding week, when production was curtailed by the Thanksgiving Day holiday, and exceeds the record of the week ended November 20 by approximately 450,000 tons.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended December 4 amounted to 1,058,151 cars, an increase of 37,312 cars as compared with the corresponding week of last year and an increase of 88,666 cars as compared with 1924. All districts showed increases as compared with the corresponding weeks of the past two years except the Northwestern and the Central Western, which fell behind the corresponding figures for both years, but coal and merchandise were the only commodity classifications to show increases as compared with last year. Coal loading reached the record figure of 251,626 cars, an increase as compared with last year of 59,793 cars, but the loading of grain and grain products was 9,751 cars less than that for last year and miscellaneous loading showed a decrease of 4,698 cars. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

REVENUE FREIGHT CAR LOADING—WEEK ENDED SATURDAY, DECEMBER 4, 1926

Districts	1926	1925	1924
Eastern	246,427	227,913	224,064
Allegheny	217,302	199,661	189,481
Pocahontas	65,181	60,064	47,949
Southern	166,297	163,835	154,096
Northwestern	115,246	121,470	119,437
Central Western	155,966	157,054	157,471
Southwestern	91,732	90,842	76,987
Total Western districts	362,944	369,366	353,895
Total all roads	1,058,151	1,020,839	969,485
Commodities			
Grain and grain products	49,882	59,633	54,021
Live stock	34,915	36,708	42,958
Coal	251,626	191,833	193,763
Coke	13,020	15,936	10,895
Forest products	64,464	69,939	73,273
Ore	11,127	12,857	10,491
Mdse. L.C.L.	266,675	262,793	249,537
Miscellaneous	366,442	371,140	334,547
December 4	1,058,151	1,020,839	969,485
November 27	942,792	923,206	879,131
November 20	1,078,812	1,057,923	1,010,919
November 13	1,112,886	1,049,940	1,016,843
November 6	1,137,210	1,062,646	995,279
Cumulative total, 48 weeks	50,587,764	48,544,657	46,029,031

The freight car surplus for the last week of November averaged 144,921 cars, including 98,794 box cars, 19,264 stock cars and 6,463 refrigerator cars, but only 12,521 coal cars. The Canadian roads for the same period had a surplus of 5,700 cars, including 4,450 box cars.

Car Loading in Canada

Revenue car loading at stations in Canada for the week ended December 4 totaled 69,657 cars, a decrease from the previous week of 6,470 cars. Compared with the same week last year there was a decrease of 2,895 cars.

	Total for Canada			Cumulative totals to date	
	Dec. 4,	Nov. 27,	Dec. 5,		
Commodities	1926	1926	1925	1926	1925
Grain and grain products	14,272	19,413	21,300	468,598	456,144
Live stock	3,088	2,933	3,089	109,651	118,790
Coal	9,684	10,037	6,735	300,792	215,129
Coke	422	435	488	18,270	14,808
Lumber	3,013	3,531	3,161	174,179	171,400
Pulpwood	1,147	1,470	2,189	120,684	117,583
Pulp and paper	2,211	2,080	2,494	113,835	99,578
Other forest products	3,085	2,945	2,414	147,863	135,226
Ore	1,645	1,521	1,317	84,428	68,716
Merchandise, L. C. L.	17,304	17,413	16,285	792,387	739,360
Miscellaneous	13,786	14,349	13,080	694,625	628,578
Total cars loaded	69,657	76,127	72,552	3,025,312	2,765,312
Total cars received from connections	36,827	36,442	34,181	1,793,009	1,603,933

Los Angeles & Salt Lake Valuation Before Court

WASHINGTON, D. C.

THE case involving the Interstate Commerce Commission's valuation of the Los Angeles & Salt Lake, which the railroad is contesting in the courts, and which it is hoped may result in a judicial determination of some of the important questions involved in the valuation proceedings, has been assigned by the Supreme Court of the United States for argument on January 3.

P. J. Farrell and E. M. Reidy, counsel for the Interstate Commerce Commission, have filed a brief urging the reversal of the decree of the district court for the Southern District of California, Southern Division, annulling the valuation order of the commission. The commission's brief also asks the dismissal of the petition filed for the railroad for a degree setting aside the valuation order and perpetually enjoining the commission from using the valuation for any purpose. The railroad brief is due on December 28.

One of the chief points discussed in the brief is the opinion of the lower court that the commission erred in concluding that the value of common-carrier property for rate-making purposes is not necessarily the same as the "exchange" value of that property. The railroad petition contends that, because it confined to rate-making purposes the value fixed by the order, the commission exceeded the authority conferred upon it by law. After citing numerous decisions the commission brief says:

"We think the foregoing extracts clearly indicate that in the minds of the courts there is a distinction between the method of procedure to be adopted and followed in fixing a value of a common-carrier property for rate-making purposes, and the method to be pursued in valuing the same property for purchase purposes; in other words, that the value of common-carrier property for one purpose is not necessarily the value of the same property for another purpose.

What Value Used

"However, even if it were possible for the commission to fix the value of common-carrier property without considering the purpose for which the value would be used, it would still be impossible to include in that value property used for purposes other than those of a common carrier. This is true, first, because by paragraph entitled 'Third' of the valuation act the commission is required to show separately the property held for purposes other than those of a common carrier, and second, because it cannot be contended consistently that in determining the amount of money upon which a carrier has a right to exact a fair return from the public for transportation services the value of the property it uses in connection with such services should be added to the value of the property it uses for other purposes.

"But, while the value of property used for purposes other than those of a common carrier cannot properly be added to the value of property used for common-carrier purposes, in determining the value upon which a carrier has the right to exact a fair return for transportation services from the public, it is apparent that such a combination of values would be entirely proper in determining the amount of stocks, bonds and other capital liabilities the carrier should be permitted to issue.

"As above shown, the appellee alleges 'that there is not attributable to its property in law or in fact a value for rate-making purposes distinguished from the value thereof for all other purposes.' In other words, the appellee contends that what is known as the 'exchange,' value must be used for rate-making purposes.

"At the date of the passage of the valuation act, namely, March 1, 1913, rate-making was the only purpose for which the commission had occasion to use a value of the properties used by a carrier for common-carrier purposes, and it is therefore apparent, we submit, that rate-making is the only purpose for which the Congress, by the passage of the valuation act, intended to require the commission to ascertain and report a value of such properties.

"By amendments to the interstate commerce act, contained in the transportation act of February 28, 1920, however, as shown by the appellee, the commission is required to use for other purposes the values of the properties of common carriers." The brief then quotes from section 15a, in which references are made to the use of valuations "for rate-making purposes" and from the sections relating to the ascertainment of values of properties sought to be consolidated, continuing:

"We think the foregoing clearly establishes that in ascertaining and reporting for rate-making purposes the values of appellee's properties, the commission acted in accordance with the duties imposed and the authority conferred upon it by the valuation act.

"The court decisions to which we have referred show plainly that there is a distinction of importance between the exchange value on the one hand and a value for rate-making purposes on the other hand, and the quotations from the interstate commerce act last above set forth are equally clear to the effect that the latter value must be the result of a consideration of all elements recognized by the law of the land for rate-making purposes and must be used by the commission in connection with all matters over which it exercises jurisdiction. In other words, the values of the appellee's properties that the commission is required by the interstate commerce act, including the valuation act, to ascertain, report and use, are the values of said properties for rate-making purposes.

"In fixing values for other purposes the commission may, and undoubtedly will, have occasion to modify to nome extent the values fixed by it for rate-making purposes, but in each instance the basis of the value to be fixed must be the value for rate-making purposes the commission is required by the valuation act to ascertain and report."

As to the point made by the railroad that while the date of the commission's order is June 7, 1923, the final value named therein has been fixed by the commission as of June 30, 1914, and that the valuation act requires that the commission fix a final value as of the date of the order by which the value is fixed, the brief says: "We respectfully submit that as a matter of grammatical construction the words 'final as of the date thereof' mean final as of the date of the value, regardless of the date of the order by which the value is fixed. If this were not true, performance by the commission of the duties imposed upon it by the valuation act would, as a practical matter, be impossible, because of the time necessarily consumed in making the inventory of the properties of a comparatively large railroad system like that of appellee.

"It is alleged that the value as of June 30, 1914, can serve no useful purpose in connection with the duties imposed upon the commission by the valuation act. This allegation is denied by the commission in its answer, and does not appear to us to harmonize very well with the allegations that the immediate and continuing effect of the order will be to depreciate the value of appellee's

property, stocks and bonds, and to injure and impair appellee's credit and its ability to borrow money. It is apparent, we think, that the value as of June 30, 1914, may properly be used by the commission hereafter in fixing the value of appellee's property as of a date subsequent to June 30, 1914, in accordance with the duty imposed upon it in that connection by paragraph (f) of the valuation act.

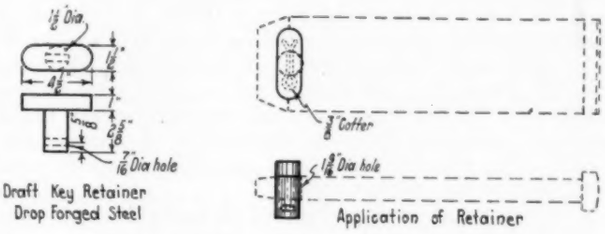
"The lower court expressed the opinion that the additional evidence introduced in that court by the appellee, that is, evidence which had not been introduced in the proceeding before the commission, shows that the value on June 30, 1914, of appellee's common-carrier property was greatly in excess of the value as of that date fixed by the commission. To the extent that the evidence is additional, however, it relates to circumstances which arose and acts which took place subsequent to June 30, 1914. We therefore conclude that the expression of opinion referred to is not based upon the lower court's view of conditions which, as matters of fact, existed on said date of valuation, but is based instead upon a further opinion expressed by the court to the effect that, as a matter of law, the value of common-carrier property for rate-making purposes is not necessarily the same as the exchange value of that property."

A. R. A. Adopts Draft Key Retainer

IT is believed that derailments on American railroads will be appreciably reduced as the result of the perfection by the Chicago, Milwaukee & St. Paul of a non-slip drawbar key cotter pin. The pin has been accepted by the American Railway Association and K. F. Nystrom, engineer of rolling stock of the Milwaukee, its designer, was voted a substantial reward. Prompt action by the railroads in adopting the pin as standard is expected. This new pin forms a positive lock which prevents the coupler separating from the car.

Its widespread use, it is understood, will eliminate one of the chief causes of derailments. A careful check of derailments caused by old style cotter pins shows that at least 100 such accidents occur annually. Thus, according to the report of the American Railway Association, "failure of these cotters results in a serious condition, as there is nothing to prevent the draft key from working out of place. When this occurs, the coupler is pulled out and falls on the track, frequently causing derailments."

A special committee of the association recently made



The Nystrom Draft Key Retainer

an exhaustive investigation of derailments on four of the country's large rail systems in widely separated sections. One road reported no less than eight derailments in a period of 14 months directly resulting from drawbar key cotter pins shearing off or becoming lost. The other roads reported numerous instances where broken or missing cotter pins had become a menace. The report further states:

"The inadequacy of the cotters in general use is further indicated by the fact that many roads are applying to their own cars other devices to retain the draft keys in place. The greater number of these special draft key retainers, while effective, are in some cases thought to be unnecessarily expensive and difficult of application to existing cars."

The American Railway Association, by formally adopting the Nystrom pin, makes it available to manufacture by all railroads without any patent or royalty charges.

Underwood & Underwood

An Electric Train Passing the Castle of Chillon Made Famous by Byron's Poem

High Pressure in Locomotives*

The use and advantages of high steam pressure is discussed

By Edward C. Schmidt[1] and John M. Snodgrass[2]

IN the older current locomotives the working pressure lies generally between 180 and 210 lb. gage; in those of recent construction it varies from 200 to 250 lb. The last-mentioned pressure is still unusual, and of the 70,000 locomotives on the railroads of the United States, fewer than a thousand carry this pressure, which is the present maximum in locomotive boilers of standard design. The practice abroad has not differed much from our own in this respect.

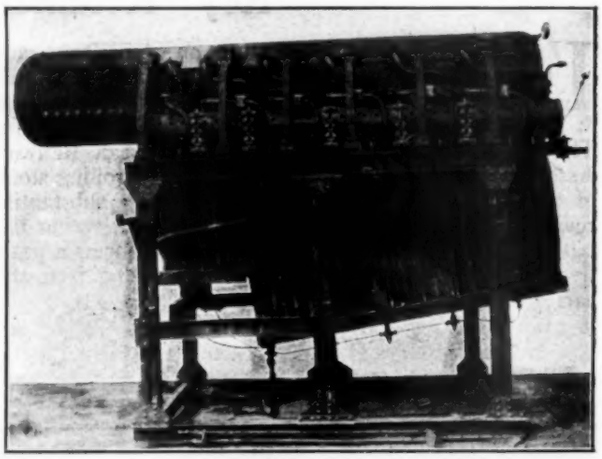
In the use of high pressures, locomotive practice has lagged behind that in stationary plants, chiefly because of the difficulty of adapting the water-tube boiler to locomotive conditions. Within the last ten years the working pressure in central generating stations has been increased to about 600 lb. per sq. in.; and for special purposes, in small boilers of special design, the working pressure has been carried as high as 1,500 lb.

The firebox of the ordinary locomotive has extensive flat surfaces the proper staying of which becomes more difficult as the working pressure is increased. While the maximum pressure for which it is possible properly to stay the ordinary firebox is not yet definitely settled, it probably lies between 275 and 300 lb. In view of this fact and of the pressures in current use the term "high steam pressure" may be defined for the purposes of this presentation as a pressure of 300 lb. or more. Since, however, there are at present only two reciprocating locomotives using so high a pressure, certain facts are presented about those locomotives which operate at or near the usual current maximum pressure, namely, 250 lb.

Increasing the train load has always been, in American practice, the usual resort for attaining economy in general operation, and it has resulted in an unremitting demand for locomotives of greater capacity or tractive force. For the locomotive designer an increase in steam pressure is an easy way to a moderate increase in capacity, and there has been a steady increase in boiler pressure from the earliest days of locomotive construction; the progress, however, has thus far been made by small steps of 10, 15, or 20 lb. at one time, and it has generally involved no radical departures in design. Interest in higher pressure is no new thing; what distinguishes our present interest in the subject is that the contemplated pressure increases far exceed our previous changes—the pressure used in two American locomotives is 100 and 150 lb. in excess of the current maximum, and in the high-pressure locomotive of the German State Railways, the excess is 600 lb.

The Attitude Toward High Pressures Twenty-Five Years Ago

Twenty-five years ago there was considerable discussion of this subject, although it was then conceived in terms rather different from those in which we view it today. Under the demand for increased capacity the locomotive designer was confronted with the question as to whether to get this increase by using higher pressure or by applying a larger boiler and using steam of the then current pressures in larger cylinders. The common pressures of the time were 180 to 200 lb.; 250 lb. was then considerably in advance of any existing practice. Dr. W. F. M. Goss, in 1904 and 1905, undertook experiments to try to settle this question. He measured the performance of a locomotive using saturated steam in single-expansion cylinders, operated under boiler pressures of 120, 160, 180, 200, and 240 lb. per sq. in. These tests defined the direct gains due to higher pressure, and also the evaporation per pound of coal under different rates of combustion and of evaporation. He then calculated the increased heating surface which might be obtained if the increase in boiler weight required by the higher pressures were used instead to produce a boiler of ampler heating surface which would operate under the lower pressure and—by virtue of its greater



High Pressure Boiler and Water-tube Firebox of the Ultra-high Pressure Locomotive on the German State Railways Built by Henschel & Sohn

heating surface—under a more economical rate of combustion. The results indicated that for pressures of 180 lb. and above the gain due to increased pressure would be nearly or quite offset by the gain in evaporative efficiency obtainable from the larger boiler of like weight. After making due allowance for the increased difficulty and cost of maintenance at the higher pressures, Dr. Goss concluded that for the pressures under consideration and for saturated steam in simple cylinders there was no substantial overall economy in using pressures in excess of 180 or 200 lb. His chief conclusions were: "Assuming 180 lb. pressure to have been accepted as standard, and assuming the maintenance to be of the highest order, it will be found good practice to utilize any allowable increase in weight by providing a larger boiler rather than by providing a stronger boiler to permit higher pressures"—and "A simple locomotive using saturated steam will render good and efficient service

*Abstract of paper presented December 7, 1926, by the Railroad Division at the annual meeting of the American Society of Mechanical Engineers, New York.

[1]Professor of railway engineering, University of Illinois, Urbana, Ill.

[2]Professor of railway mechanical engineering, University of Illinois, Urbana, Ill. Professor Snodgrass died on December 4.

when the running pressure is as low as 160 lb.; under most favorable conditions, no argument is to be found in the economic performance of the engine which can justify the use of pressures greater than 200 lb."

In comparing these conclusions with the views held today it must be borne in mind that the design of recent locomotives has encroached much further upon the available space and weight limits than did the locomotive of two decades ago, that we are now using superheated steam, and that never before in the history of the railroads has the necessity for the greatest economy in steam and coal been so urgent.

The interest in high boiler pressure persisted, however, notwithstanding Dr. Goss's conclusions, because at the time, the demand for increased capacity overshadowed considerations of economy. The situation in America was presently greatly relieved by the introduction of superheated steam which, although it had been for some years in use on European roads, was first extensively applied here to locomotives on the Canadian Pacific Railway about 1905. The great gain in capacity and economy resulting from its use far exceeded anything to be hoped for from such increases in steam pressure as were then under consideration, and proposals for general pressure increases were temporarily dropped.

The Advantages to Be Derived from High Pressure

The reasons for considering higher pressure in locomotive service and the advantages to be derived from its use may be stated as follows: (1) The use of higher steam pressure results in a considerable decrease in steam consumption, and a corresponding—though slightly smaller—decrease in coal consumption. (2) Within the usual fixed limits of width and height the locomotive designer may obtain greater tractive force and greater power by increasing the boiler pressure. It is fortunately possible to obtain simultaneously both of these benefits; and it is not necessary, as in some locomotive-economy-promoting devices, to trade economy for capacity or vice versa.

TABLE I—SHOWING RANKINE-CYCLE EFFICIENCIES FOR SINGLE-EXPANSION CYLINDERS, USING STEAM AT VARIOUS INITIAL PRESSURES, SUPERHEAT OF 250 DEG., AND EXHAUSTING AGAINST 20 LB. ABSOLUTE BACK PRESSURE

Initial steam pressure, lb. per sq. in. gage	Temperatures: Of the saturated steam, deg. Fahr.	Temperatures: Of the superheated steam, deg. Fahr.	Rankine-cycle efficiency, per cent	Gain in efficiency over that attained with 200 lb. initial pressure, per cent	Increment of gain, per cent
200	388.0	638.0	18.90	....	....
250	406.2	656.2	20.34	7.61	7.61
300	421.9	671.9	21.50	13.75	6.14
350	435.9	685.9	22.49	19.00	5.25
400	448.4	698.4	23.38	23.70	4.70
500	470.2	720.2	24.81	31.28	7.58
600	489.1	739.1	25.98	37.46	6.18
700	505.7	755.7	26.95	42.59	5.13
800	520.6	770.6	27.76	46.88	4.29
900	534.2	784.2	28.47	50.63	3.75

If the new high-pressure type of boiler proves ultimately to be inherently lighter than the present standard boiler, then, for a given total engine weight, it will be possible to obtain greater tractive force with high steam pressure; but we cannot know whether this will be true until the new type of boiler has been further developed and perfected.

The magnitude of the gains to be derived from high pressure is illustrated by the Rankine-cycle efficiencies shown in Table I, for pressures varying from 200 to 900 lb., at 250 deg. superheat, and an absolute back pressure of 20 lb. per sq. in. The fifth column shows the gains in efficiency expressed as percentages of that attained at 200 lb. pressure; it will be noted that 400-lb. steam gives 23.70 per cent greater efficiency than 200-lb. steam, and 800-lb. steam gives 46.88 per cent more than 200-lb. In view of the difficulties of utilizing extremely high pressures on locomotives, it is significant to observe that the increment of gain decreases as the pressure is increased. As indicated in the last column of Table I, the efficiency to be gained by raising the steam pressure from 200 to 300 lb., for example, is 13.75 per cent; whereas the gain by increasing the pressure from 800 to 900 lb. is only 3.75 per cent; in other words, while the total gain in efficiency secured by increasing the pressure from 200 lb. to 900 lb. is over 50 per cent, the first 100-lb. stage of the increase gives more than 3½ times as much benefit as does the last 100-lb. stage.

In reciprocating non-condensing engines operating with moderate pressure and under excellent conditions, the actual efficiency has proved to be from six-tenths to seven-tenths of the ideal efficiency shown in Table I. The proportion varies, depending on whether the engine is operated simple or compound, and upon the amount of superheat. There will probably be no very radical modification of this proportion with the use of higher pressure and we are warranted in expecting that the relation between the actual efficiencies at various pressures will not differ greatly from the relation between the theoretical efficiencies shown in the table. Such considerations make it certain that the gains attainable by the use of high pressures are considerable and well worth striving for.

As has already been pointed out, the second advantage, namely, the increase in tractive force attainable with high pressures, has always been of great importance and it has become more and more so as locomotive design has approached closer to the weight limits and to the space limits set by the track clearance, which have been nearly or quite reached in many instances. Anything which under these conditions will permit the designer to continue to produce a more powerful machine which will draw a heavier train is bound to be regarded as of the utmost importance by every railroad operating officer, for it opens again the avenue to highest operating efficiency and economy.

Both advantages are important, and which one is regarded as the more so will depend upon the circumstances. Probably in European practice, with their light train load and high fuel cost, the gain in economy will seem more important than the gain in power; although present fuel costs on American roads have mounted to a point where our attitude toward such an engineering problem must be quite different from what it might properly have been ten years ago.

There are some difficulties in the design and operation of high-pressure locomotives which, while probably not insuperable, ought nevertheless to receive due consideration. As has been intimated, the use of pressures above 300 lb. has entailed and will entail radical departures in boiler design. The experience with the Brotan boiler, having a firebox of watertube construction, has, however, been extensive and encouraging. Similar types of construction have been used in the Horatio Allen[1] and in the high-pressure locomotive built by Henschel & Sohn for the German State Railways.[2] While the maintenance of such boilers, the maintenance of valves and piping, and lubrication under high temperature will introduce problems new to the railroad man there is in the results attained in high-pressure stationary plants ground for the hope that these problems can be satisfactorily solved; and the experience of the New York, New Haven & Hartford with the McClellon boiler[3] offers similar encouragement.

In the opinion of many railroad men, one of the most

[1] *Railway Age*, February 7, 1925, page 353.
[2] *Railway Age*, June 26, 1926, page 1969.
[3] *Railway Age*, March 6, 1926, page 575.

serious problems to be solved in adapting the high-pressure water-tube type boiler to American railroad conditions lies in the almost universal use of untreated boiler waters on our railroads. Under the high temperature of the high-pressure steam the scaling is sure to be serious, and the proper washing and cleaning of these boilers will interpose a serious objection to their widespread use. Such an objection is not, of course, insurmountable, but it will undoubtedly greatly retard the adoption of high-pressure locomotives in many situations.

Limit Undetermined

The maximum steam temperature which it is possible to carry without impairing the strength of the engine parts or without incurring unusual difficulties in lubrication remains to be determined. The maximum safe temperature is commonly held to be not over 750 deg. F., although the basis for this opinion is not generally stated. Fortunately the maximum steam temperature contemplated for locomotives does not greatly exceed this present limit. At 900 lb. pressure and 250 deg. superheat, for example, the temperature of the steam is 784 deg., which is only 146 deg. more than the temperature of 200-lb. steam with the same superheat (638 deg.). In high-pressure stationary plants the steam temperature runs in the neighborhood of 700 deg. to 725 deg. It seems likely that the difficulties arising from such increases in temperature as are entailed by the use of steam of even 900 lb. pressure can ultimately be overcome.

Experience in Stationary Plants

High-pressure steam has been experimented with and employed in stationary practice to a much greater extent than in locomotives. The common employment of water-tube boilers and the use of condensers in stationary plants, together with the limiting conditions found in locomotive service, have naturally led to the greater development in stationary practice. Experimentally, and to a considerable extent commercially, various steam pressures have been used up to as high as 1,500 lb. per sq. in. The use of steam pressure in the neighborhood of 1,200 lb. per sq. in. has received attention both in this country and abroad. A plant with a capacity of 150,000 lb. of steam per hour, designed for a pressure of 805 lb. per sq. in., is now in process of erection. Numerous stationary plants are in operation which employ steam pressures ranging from 300 to 500 lb. per sq. in.

In Recent Design

The use of high-pressure steam appears to have been accepted as the best practice in the design and operation of several large central power stations which have been built recently. Facts obtained from large-scale operations, together with opinions expressed by practically all other recent users of high-pressure steam and by builders of equipment for this service, indicate the practicability of using high steam pressures and temperatures and of obtaining and maintaining equipment which will be satisfactory for pressures up to 800 lb. per sq. in. or higher, and for temperatures up to 700 to 750 deg. F. Experience in stationary practice has satisfactorily answered many of the questions which have arisen regarding the employment of high pressures and temperatures. The special problems which arise in locomotive practice due to conditions peculiar to that service are being vigorously attacked. They appear to offer no insurmountable difficulties.

Midland Valley Installs Direct Coaling Station

THE coaling of locomotives at points where only a few engines are handled is usually both slow and expensive, since there is not a sufficient amount of coal used to justify the installation of a plant of the overhead storage type, while almost all other types of plants suitable for such requirements involve shoveling the coal by hand. To obviate these disadvantages the Midland Valley has installed at its Wichita, Kan., engine terminals, a small mechanical coaling device which transfers the coal direct from a hopper-bottom coal car to the locomotive tender, the operation necessitating only one attendant for such time as is required to coal an engine, usually from 15 to 20 minutes.

Essentially the device consists of a concrete receiving hopper over which the coal car is placed and through which the coal is delivered by a 24-in. by 24-in. clam-shell gate to a 1¼-ton capacity elevating bucket which is hoisted on an inclined track forming part of a substantial steel structure and dumped automatically into the locomotive tender, returning to its position under the hopper after being dumped.

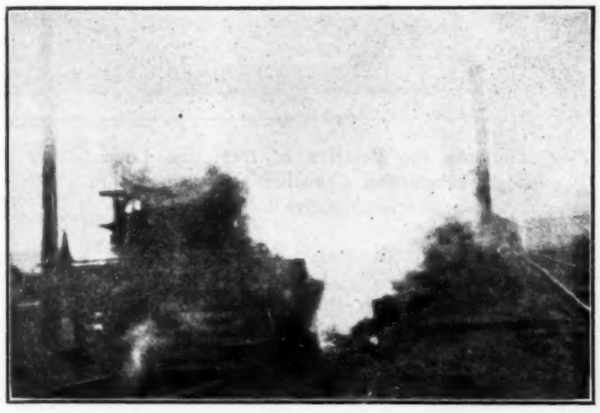
The New Coaling Plant Transfers the Coal Direct from Cars to Locomotive

The plant is operated by a nine-horsepower high torque, squirrel cage motor, equipped with a Cutler-Hammer controller of the semi-automatic push-button type. The controller stops the bucket automatically in its filling and dumping positions and a machine type limit switch geared to the hoisting drum controls the travel of the bucket between its two limits. A solenoid brake is provided for holding the load in case the current fails. All of the operating mechanism is mounted in a weather-proof steel housing at the top of the structure, thus avoiding the obstruction of a machinery house at the ground level, and a push-button station is installed at a point convenient to the operator for control.

Annual Report of the Bureau of Locomotive Inspection

Decrease of 16.8 *per cent in number of accidents—Increase of* 10 *per cent in number killed*

THE 15th annual report of A. G. Pack, chief inspector of the Bureau of Locomotive Inspection, to the Interstate Commerce Commission stresses the fact that although there was a substantial decrease in the total number of accidents during the year ending June 30, 1926, a still greater decrease should have resulted had the requirements of the law and rules been complied with, especially with respect to defects the repair of which are frequently considered unimportant. Boiler explosions caused by crown sheet failures continue to be the largest source of fatal accidents, 17 of the 22 fatalities from all locomotive failures during the year being attributable to that cause.



Locomotive Ready for Passenger Service with Steam Leaks From Piston Rod Packing and Cylinder Joints Obscuring the View of the Engineman

The report contains a summary of all accidents occurring during the year ending June 30, 1926. A total of 574 accidents occurred in the 12 months' period covered by the report, a decrease of 16.8 per cent from that of the preceding period. There is, however, an increase of 10 per cent in the number killed over the preceding 12 months. During 1926-25 a total of 22 persons were killed as compared with 20 for 1925-24. The number of injured, however, shows a decrease from 764 during 1925-24, to 660 during 1926-25.

PERSONS KILLED AND INJURED, CLASSIFIED ACCORTING TO OCCUPATION

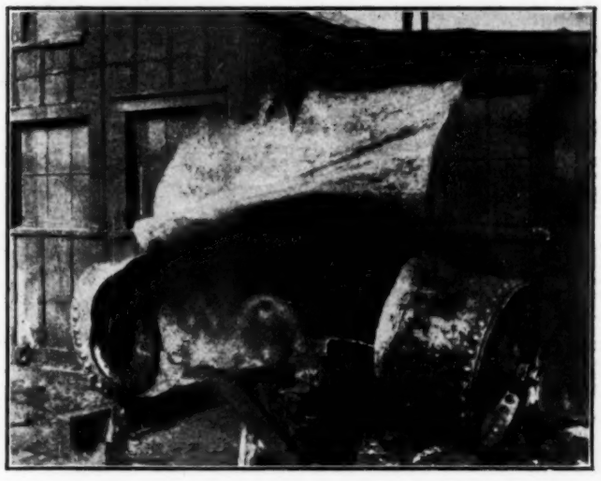
	1926		1925		1924		1923		1922	
Members of train crews:	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured
Engineers	5	210	8	230	19	330	19	484	11	213
Firemen	6	230	6	300	22	434	16	597	10	277
Brakemen	3	77	2	84	9	102	12	137	7	66
Conductors	2	28	..	25	2	39	1	35	..	25
Switchmen	..	19	..	23	1	29	2	32	1	13
Roundhouse and shop employees:										
Boiler makers	..	5	..	6	1	24	3	19	1	10
Machinists	..	5	..	13	1	9	2	14	..	9
Foremen	..	3	..	...	1	6	1	6	..	1
Inspectors	..	...	..	2	1	3	..	2	..	2
Watchmen	1	5	1	3	..	5	1	6	..	3
Boiler washers	..	2	..	5	2	5	1	9	..	1
Hostlers	..	9	..	16	..	14	..	31	..	10
Other roundhouse and shop employees	1	15	..	10	6	34	4	29	1	15
Other employees	3	10	1	13	..	16	4	36	2	23
Non-employees	1	42	2	34	1	107	6	123	..	41
Total	22	660	20	764	66	1,157	72	1,560	33	709

The greatest number of accidents was due to defective squirt hoses of which there were 51. Thirty-eight accidents were due to defective grate shakers, 37 to defective reversing gears, 26 to defective flues and 22 to crown sheet failures on account of low water. Fifteen accidents were due to crown sheet failures caused by low water for which contributing causes or defects were found. Fifteen accidents were also caused by defective couplers.

An abstract of the report follows:

Mr. Pack's Report

A summary of all accidents and casualties to persons as compared with the previous year shows a decrease of 16.8 per cent in the number of accidents, an increase of 10 per cent in the number of persons killed and a decrease of 13.6 per cent in the number injured during the year. There was also a substantial decrease in the percentage of locomotives inspected by our inspectors found defective. During the year 40 per cent of the locomotives inspected were found with defects or errors in inspection that should have been corrected before being put in use as compared with 46 per cent for the previous year and 53 per cent for the year ending June 30, 1924.



Main Air Reservoir Which Exploded—The Sheets Were Weakened by Corrosion

While there was a substantial decrease in the total number of accidents during the year, our investigations indicate that a still greater decrease should have resulted had the requirements of the law and rules been complied with, especially so with respect to defects the repair of which are frequently considered unimportant.

Boiler explosions caused by crown-sheet failures continue to be the most prolific source of serious and fatal

accidents with which we have to deal, 72.7 per cent of the fatalities during the year being attributable to this cause. The importance of properly maintaining water-level indicating appliances that will accurately register the water level in the boiler under all conditions of service and which may be easily and accurately observed

DERAILMENTS AND CASUALTIES CAUSED BY DEFECTS IN OR FAILURE OF SOME PART OF THE LOCOMOTIVE OR TENDER

	Year ended June 30—				
	1926	1925	1924	1923	1922
Number of derailments*	23	22	30	38	22
Number of persons killed	2	...	3	4	5
Number of persons injured	49	52	112	157	61

*Only derailments reported by carriers as being caused by defects in or failure of parts of the locomotive or tender were investigated or counted.

by the occupants of the locomotive cab from their usual and proper positions, can not be overemphasized. The use of the strongest practicable firebox construction, especially within the area which may be exposed to overheating due to low water and the application of a device that will give an audible alarm when the water level approaches the danger point, would be distinct steps forward in the reduction of accidents and casualties resulting from crown sheet failures.

Our investigations of reduced body staybolt breakage show that failure most frequently occurs in the reduced

Water Glass Practically Closed by the Gasket Being Squeezed Over the End—The Glass Was Too Short When Applied

body at or close to the fillet joining the body of the bolt and the enlarged ends, and telltale holes which do not extend into the reduced section at least 5/8 in. can not be depended upon to indicate broken bolts.

A great majority of broken staybolts are found by leakage through telltale holes without the aid of the hammer test. The sound and vibration when staybolts are hammer tested varies with the location of the bolts in the firebox and also with the shape of the firebox. Inspectors depend upon the telltale holes as a check of the results of the hammer tests. If the telltale holes do not extend into the bolts to or beyond the usual point of breakage, they are not only useless as a safety feature, but become a distinct menace to safety.

No prosecutions for violations of the locomotive inspection law were instituted during the year. Three cases pending at the beginning of the year were disposed of. Judgment was assessed against the carrier in one case, one case was compromised upon payment by the carrier of the penalties sued for and judgment was rendered by the court in favor of the defendant in the third case.

Three formal appeals were taken from the decisions of our inspectors during the year, two of which were dismissed. Two items were involved in one of the appeals,

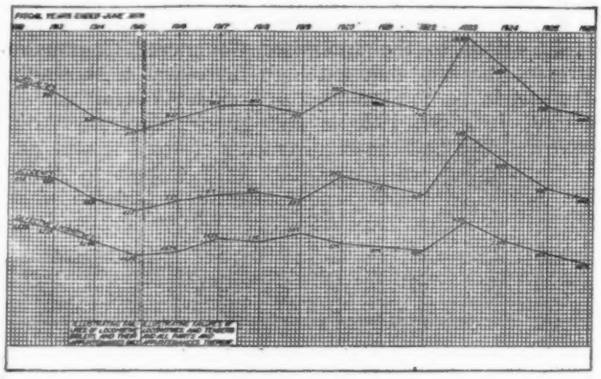


Chart Showing the Relation of Defective Locomotives to Accidents and Casualties Resulting from Locomotive Failures

one of which was dismissed while the carrier was sustained in the other.

In conformity with the established practices in the formulation of rules and instructions, conferences were held with interested parties and a code of rules for inspection and testing of locomotives other than steam was formulated and agreed upon, which was approved by order of the commission dated December 15, 1925, and made effective July 1, 1926.

In my former reports recommendations were made in accordance with section 7 of the act, as amended, for

ACCIDENTS CAUSED BY THE FAILURE OF SOME PART OF THE LOCOMOTIVE, INCLUDING THE BOILER OR TENDER

	1926	1925	1924	1923	1922
Number of accidents	574	690	1,005	1,348	622
Per cent increase or decrease from previous year	16.8	31.3	25.5	*117	15.4
Number of persons killed	22	20	66	72	33
Per cent increase or decrease from previous year	*10	69.7	8.3	*118	48.4
Number of persons injured	660	764	1,157	1,560	709
Per cent increase or decrease from previous year	13.6	33.9	25	*120	11.3

*Increase.

the application of automatic fire doors, power reverse gears, power grate shakers, automatic bell ringers, horizontal hand holds, stirrups on cabs, and water columns with water glass and gage cocks attached, with an additional water glass located on the left side or boiler back head and reasons therefore given.

Many of the carriers are recognizing the value of these appliances in the promotion of safety, efficiency and economy and are complying with the recommendations in many cases, while others are not; therefore, the recommendations are respectfully renewed and should be made a requirement of the rules.

Audible low-water alarms are now being experimented with successfully and are being applied by many of the carriers. The general application of a dependable low-water alarm would be of inestimable value in reducing the number of serious and fatal accidents.

C. N. Whitehead, Missouri-Kansas-Texas President, Dies

Excessive work resulting in nervous breakdown ends seven months' service as chief executive

CHARLES N. WHITEHEAD, president of the Missouri-Kansas-Texas lines, died on December 10, at St. Luke's hospital, St. Louis, Mo., after an illness of nearly six weeks. He suffered a nervous breakdown in October and entered the hospital on December 6, upon his return from a trip to Florida where he had gone to regain his health.

Mr. Whitehead's death when he was less than 49 years old undoubtedly was due indirectly to excessive work and too little rest and recreation over a long period of years. He seemed naturally to have a good constitution. Like many ambitious railway men, however, he was intensely interested in transportation and extremely conscientious regarding the performance of his official duties. About two years ago he was warned by physicians that his physical condition was becoming dangerous and ordered to take a six months' rest. He went away for a while, but did not stay as long as ordered. He seemed to be much improved on his return, resumed his hard work and last spring on the retirement of Mr. Schaff succeeded him as president. Some weeks ago his condition again became such that he was ordered to take a long rest, but developments proved it too late.

C. N. Whitehead

After a railway career almost entirely in the service of the Missouri-Kansas-Texas, Mr. Whitehead had just entered a period of maximum usefulness to that property as its chief executive, for his election as president of the Katy became effective only on last May 1, following the retirement of Mr. Schaff, and while the proposed merger of the Kansas City Southern, the M.-K.-T. and the St. Louis Southwestern, Mr. Whitehead was being considered.

The story of Mr. Whitehead's career is similar to that of most railway executives in that he "rose from the ranks." He entered the service of the Missouri-Kansas-Texas as a messenger in a local freight office when he was only 14 years old. Promotions came to him steadily and he became federal manager when only 42 years old and president when only 48.

Mr. Whitehead maintained an "open door" policy in his relations with the public and particularly in his dealings with visitors at his office. Here he made it a practice to reach in person or by letter all those who had called at his office during his absences from the city.

He had a most kindly nature and genial personality. He was much younger than many employees who had known him since he was a boy, and even after he was president it was not unusual when he was going over the line for some veteran employee who had known him long to call him "Charlie" and for Mr. Whitehead to call the veteran "Mister" in reply.

He served under various administrations during which the railway's fixed charges were so high that it could get little capital for needed improvements, and learned in that hard school how to make a railway dollar go as far as possible. He later served for years under Mr. Schaff, who became president of the road when it was already drifting into bankruptcy and who, as its receiver, made the large capital expenditures necessary to transform it into a modern railroad physically and in its operating performance. He had the personality, ability and experience needed for the successful management of a railway such as the Katy, but his early death denied him the opportunity to show how he could make use of them.

Charles Nelson Whitehead was born on January 23, 1878, at Princeton, Ill. His first job was that of messenger in the Cairo, Ill., freight office of the St. Louis Southwestern in 1892. In that same year he obtained a similar position in a freight office of the Missouri-Kansas-Texas. In 1900 Mr. Whitehead served for a time in the office of the general attorney in Texas, and the following year he returned to a superintendent's office. Three years spent in the office of the general counsel were followed by promotion to assistant secretary of the railroad, with headquarters at New York, and in 1906 he was elected secretary. In 1909 he was elected to the position of treasurer as well as that of secretary and in 1913 was selected as assistant to the president. He was appointed chief operating officer for the receiver in 1920 and was elected executive vice-president on April 1, 1923, holding that position until his election to the presidency on May 1, 1926.

Gulf, Mobile & Northern Uses Daily Record of Transportation Costs

Method of compiling data makes reasonably accurate information available on following morning

TO exercise control over expenses it is essential that the costs be ascertained and made available at the earliest possible moment so that corrective measures may be applied promptly when necessary to avoid further loss. On the Gulf, Mobile & Northern a surprisingly close approximation of all transportation expenses for the preceding day is known in the office of the assistant general manager at 10 a. m., thus enabling a close check to be made of operating costs and the necessary revisions of practice or force to be made before any unfavorable conditions can gain headway. This road owns and operates 466 miles of lines between Mobile, Ala., and Jackson, Tenn., and in addition now operates by trackage rights over the Nashville, Chattanooga & St. Louis between Jackson, Tenn., and Paducah, Ky., a further distance of 145 miles. Operation, as well as other matters of general scope, are now handled by the assistant general manager in lieu of two division superintendents formerly employed.

The Accounting Sub-divisions

The only definite and accurate knowledge of the past expenses of a railroad is generally that embodied in the monthly income account statement in which all moneys expended for operation are listed under the head of operating expenses, with seven sub-divisions under that account as prescribed by the Interstate Commerce Commission as follows:

1. Maintenance of Way and Structures.
2. Maintenance of Equipment.
3. Traffic.
4. Transportation.
5. Miscellaneous Operations.
6. General.
7. Transportation for Investment—Cr.

These general accounts are further divided into sub-accounts which are prescribed by the Interstate Commerce Commission, Account 4 Transportation, containing 42 sub-accounts as follows:

No. 371. Superintendence.
No. 372. Dispatching trains.
No. 373. Station employees.
No. 374. Weighing, inspection and demurrage bureaus.
No. 376. Station supplies and expenses.
No. 377. Yard masters and yard clerks.
No. 378. Yard conductors and brakemen.
No. 379. Yard switch and signal tenders.
No. 380. Yard enginemen.
No. 382. Fuel for yard locomotives.
No. 385. Water for yard locomotives.
No. 386. Lubricants for yard locomotives.
No. 387. Other supplies for yard locomotives.
No. 388. Enginehouse expenses—yard.
No. 389. Yard supplies and expenses.
No. 390. Operating joint yards and terminals—Dr.
No. 391. Operating joint yards and terminals—Cr.
No. 392. Train enginemen.
No. 393. Train motormen.
No. 394. Fuel for train locomotives.
No. 397. Water for train locomotives.
No. 398. Lubricants for train locomotives.
No. 399. Other supplies for train locomotives.
No. 400. Enginehouse expenses—train.
No. 401. Trainmen.
No. 402. Train supplies and expenses.
No. 403. Operating sleeping cars.
No. 404. Crossing protection.
No. 407. Telegraph and telephone operation.
No. 408. Operating floating equipment.
No. 410. Stationery and printing.
No. 411. Other expenses.
No. 412. Operating joint tracks and facilities—Dr.
No. 413. Operating joint tracks and facilities—Cr.
No. 414. Insurance.
No. 415. Clearing wrecks.
No. 416. Damage to property.
No. 417. Damage to live stock on right-of-way.
No. 418. Loss and damage—freight.
No. 419. Loss and damage—baggage.
No. 420. Injuries to persons.

In computing the daily transportation expenses on the Gulf, Mobile & Northern arbitrary figures, based on past averages, are used for all accounts except 372, dispatching trains; 373, station employees; 377, yardmasters and yard clerks; 378, yard conductors and yard brakemen; 379, yard switch and signal tenders; 380, yard enginemen; 392, train enginemen; 393, train motormen; 401, trainmen; and 407, telegraph and telephone operation. Thus the expenses are quite well fixed except for labor and fuel and a daily computation of this latter item is not made since the arbitrary figure used has proved to be very close to the actual cost.

Certain Accounts Are Grouped

In tabulating the costs, certain groupings are adopted which further simplify the keeping of the records. Thus the items, aside from the wages of enginemen and trainmen, are grouped under seven headings as follows: (1) Superintendence and dispatching trains; (2) station employees, yardmasters and yard clerks; (3) fuel and engine house expense; (4) joint yards and terminals; (5) credits, accounts No. 391 and 413; and all other expenses. In the matter of wages, those for superintendence and dispatching trains are almost constant and it is easy to ascertain the daily cost of these items, which is used unless there should be some change during the month, in which case it is recorded immediately on the daily expense sheet. The figures for station employees, yardmasters and yard clerks, and telegraph and telephone operation are handled in like manner. This procedure leaves only the actual wages made by enginemen and trainmen to be computed daily, which is a comparatively simple operation, since all scheduled trains are operated daily regardless of tonnage and the number of employees on each train remains constant. If none of these trains makes any overtime, runs for water or doubles a hill, the wages for the scheduled trains for the day is known at once. All information as to the movement of trains is shown in the morning report which contains a recapitulation, known as the train roster, of all trains to midnight of the previous day from the dispatcher's train

sheet, and which contains the following information for each train:

1. Train number.
2. Engine number.
3. From station.
4. Time called.
   (a) Time departed.
5. To station.
   (a) Time arrived.
   (b) Time released.
7. Cars handled.
   (a) Loads.
   (b) Empties.
8. Tons.
9. Overtime.
10. Conductor.
11. Engineman.

This report is compiled by the chief dispatcher's office, reaching the office of the assistant general manager at 8 a. m. and from it the costs of the engine and train crews are assembled. These costs do not include those of work trains which are directly chargeable to maintenance of way or to additions and betterments.

The Arbitraries Are Changed as Necessary

The arbitraries used for the different accounts are changed from time to time as circumstances may dictate. If any change in the force or rates of pay is made during the month in any of these accounts the arbitraries affected are changed at once. If there should be any indication that an exceptionally good record is being made in a certain account such as fuel, for instance, that arbitrary will be reduced by an appropriate percentage. The costs of the different accounts and the totals are posted on one sheet daily and are cumulative as the month progresses.

A record of equipment rents is also kept daily and this also has been simplified so that it entails little work. At the beginning of the month a sheet is prepared showing the total number of cars on the line as of midnight of the last day of the month. A report is received each morning showing the number of cars received from and delivered to connections, thus enabling a record to be kept of the total cars on the line at midnight of each preceding day. If the total exceeds the per diem cars owned by the company the difference will be a charge to rent of equipment in dollars, since the per diem charge is one dollar a day. Similarly, if the total is less than the number owned the difference will be a credit to that account. To this is added an arbitrary for reclaims and private line mileage, which on this road is always a charge. These records, like the others, are kept to show cumulative totals.

Near the end of each month the vice-president calls for estimated costs of transportation and rent of equipment, maintenance of way, and maintenance of equipment, which are furnished by the assistant general manager, the chief engineer and the superintendent of motive power respectively, while the vice-president makes his own estimates of the costs of traffic, general expenses and miscellaneous operations as well as estimates of non-operating income and deductions from gross income. He also keeps a daily record of revenue loads billed on the road and received from connections, with cumulative totals. An arbitrary gross revenue figure per car, based on past averages, together with an arbitrary figure for passenger train revenues, enables him to obtain a cumulative estimate of gross revenues daily. From this information the vice-president is in a position to tell the president two or three days before the end of the month what the operating ratio will be and about what the net revenue will amount to, as it will appear on the income account statement. It is a very unusual occurrence for this estimate of the net revenue to be more than one-half of one per cent out of the way.

At the monthly expense meeting held in the vice-president's office near the end of each month he is given the final estimates for the month drawing to a close and an estimate for the coming month. An idea as to the accuracy of these estimates may be gathered from the following tabulation in which the final estimates and the actual costs of transportation for the first six months of 1926 are expressed in terms of percentage of the first estimate for each month.

Month	First Estimate	Final Estimate	Actual
January	100	97.9	97.1
February	100	95.4	97.2
March	100	102.1	102.1
April	100	100.7	102.3
May	100	99.0	96.6
June	100	99.6	100.2
Six months	100	99.1	99.2

A copy of the statement of revenue cars billed on the line and received from connections is kept in the assistant general manager's office concurrently with the tabulation of transportation expenses, from which the estimated gross revenue is ascertained as it is in the office of the vice-president, thus providing a means of keeping a daily check on the transportation ratio, and affording a chance for analysis of costs so that measures may be taken promptly to keeping them at a minimum.

Special Figures Are Computed from Time to Time

A daily account of the mileage made per car per day is not kept as a usual thing but this is done at intervals of two or three months to stimulate interest, and is easily accomplished in connection with the other transportation records. The procedure is to have each conductor make his own wheel report and leave it with the yardmaster or yard clerk who computes the total car miles made on that run, transmitting the information to the office of the assistant general manager so that it will be received early in the morning. The collection of this information is simplified by the fact that the last scheduled train leaving a terminal before midnight is due to arrive at the opposite terminal at 8:15 a. m. Since the total number of cars on the line for the preceding day is a matter of record the miles per car for any particular day is easily arrived at as well as the average for the month up to and including that day. This information is wired to division officers and is posted on all bulletin boards to serve as an incentive to the prompt movement of cars.

Similarly, during fuel-saving compaigns, cumulative figures are kept of the pounds of coal consumed per 1,000 gross ton miles for each engine crew on through freight service and for each 100 passenger car miles for each passenger engine crew. The coal is weighed by the terminal trainmaster and mechanical forces at the end of each run by cutting the engine off the train, filling the boiler with water and then weighing the engine on a track scale, after which the tender is loaded to its maximum capacity with coal and the engine again weighed, care being taken not to work the injector during the progress of the weighing operations. The information is wired to the office of the assistant general manager where the amount of coal consumed on the road is determined. Regular crews are assigned to engines in both passenger and freight service and the figures for each day's performance are added to the previous cumulative totals for each crew, and posted on the bulletin boards, showing the names of the engineman and fireman of each crew, together with the number of the locomotive.

All of the collection and assembling of the informa-

tion for the daily statements is made without the employment of any additional clerical force or expense, with the possible exception of crowding the wires to some extent at times. The information is available about 10 a. m., for the previous day and a copy is sent by wire to the assistant general manager if he is not at his office. The figures for operating costs are also given to the trainmasters to aid them in making a careful study of expenses and keeping them under control.

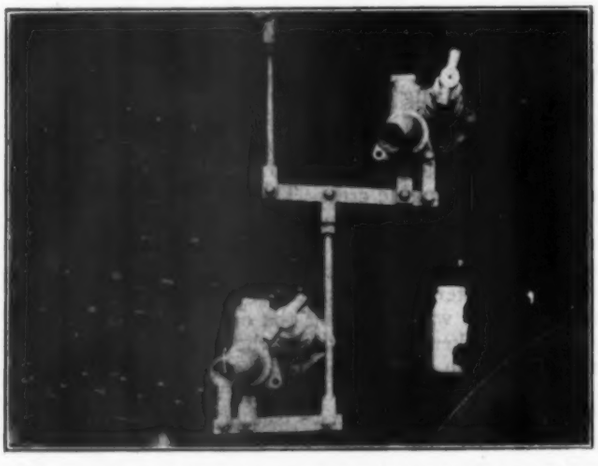
A knowledge of costs alone will not produce efficiency but it is of great value as an aid in attaching the problem and its benefits are undoubtedly reflected in the improvements which have been made on this road in the last several years as shown in the following comparative statements of performance.

Item	Six Months Ending June 30, 1926	Six Months Ending June 30, 1925	Six Months Ending June 30 1924
Average gross tons per freight train	**1,250**	**1,250**	**1,105**
Average miles per car per day, all cars	41.9	33.8	30.1
Engine failures	49	93	147
Manifest freight trains arrived at terminals on time (per cent)	98.7	87.9	71.0
Passenger trains arrived at teminals on time (per cent)	97.4	98.3	83.0
Average lb. coal per 1,000 gross ton miles	125	135	154
Average lb. coal per 100 passenger car miles	1,585	1,745	2,015
Reportable train accidents	9	16	23
Reportable personal injuries	39	51	53
Drawbars pulled out	35	36	87

In June of the present year the consumption of coal was reduced to 117 lb. per 1,000 gross ton miles and this road at the end of that month was leading all the roads in the Southern district for the present year in that respect. During the same month the average gross tons per freight train reached 1294, a new record for the road, while the average miles per car per day for all cars was increased to 47.8.

Sludge Remover for Locomotive Boilers

THE Bird-Archer Company, Chicago, has placed on the market a sludge remover which is designed to remove sludge from all parts of the mud ring as well as from the bottom of the boiler shell.



Exterior View of Sludge Remover Showing the Lever Rigging for Operating Both Blow-off Cocks at the Same Time

The device consists of slotted pipes which run along the belly of the boiler and the waterlegs of the firebox. These pipes are copper and are slotted or drilled at intervals along the bottom for their entire length. They are attached directly to two large blow-off cocks, both located on the same side of the firebox and connected to the same operating lever in the cab, as shown in the illustration. When the blow-off cocks are open, the upper one draws sludge through the slotted copper pipe from the bottom of the boiler shell and the lower one draws sludge through the slotted pipes from the water legs.

Since the slotted pipes are made of copper there is less tendency for scale to deposit on them and no pitting or corrosion.

Freight Claims Prevented Through Supervision

By J. L. Wilkes
General Manager, Jacksonville Terminal Company

THE secret of freight claim prevention lies in ascertaining where the cause is, what it is and why it is. Practically all freight claims, especially on less-than-carload freight, are predicated on an exception report and the handling of claim prevention work from an exception standpoint will accomplish more satisfactory results than handling from a claim prevention or claim payment standpoint. The exception report should be made the "red flag" or indicator in pointing out irregularities in the handling of a shipment. By the accumulation of these exception reports against an individual station, commodity and cause, it is an easy matter to locate where the trouble is occurring and determine the corrective measures necessary to overcome the cause.

If I owned a railroad I would want an officer in direct charge of station and claim work and I would want all exceptions on carload and less-than-carload freight sent direct to him. This officer should keep daily tabulations of these reports and should wire to each general superintendent at least every ten days the total number of exceptions received during the previous ten days, divided as between carload and less-than-carload traffic. As soon as possible he should send a comparison with the same period in the previous month and the previous year. The general superintendent should immediately communicate with the division superintendent, and thereby enable the latter to keep in close touch with the exceptions charged against each station and apply corrective measures to overcome any increase in exceptions not proportionate with the tonnage being handled. At the close of each month the central office should send a tabulated statement to the general superintendent, with copies to the division superintendents, showing the total less-than-carload and carload exceptions received for the month, divided for the different classes of exceptions, stations, divisions and grand divisions.

In view of the fact that claims may be almost entirely chargeable to station, train and yard operation and the mechanical condition of the equipment, it is certain that we will not accomplish all that can be done until we have these three branches of the service working in perfect unison and understanding. Freight claim prevention has so many ramifications that it cannot be handled as a matter separate and distinct to itself. Practically every angle of station, transportation and mechanical service

*From an address before the annual meeting of the Claim Prevention committee of the Third division of the Atlantic Coast Lines at Jacksonville, Fla.

enters into it and I believe that the supervision should be for the purpose of promoting efficiency in station operation, including both platform and office force, uniform methods of operation, the proper policing and distribution of less-than-carload freight, car utilization, and the adoption and employment of methods in handling less-than-carload freight, as well as the overcoming of causes for freight claim payments. This should be the objective of the central officer and in accomplishing it he should be entrusted with the following specific duties:

1—Exercise supervision over the operation of station, transfer and office forces insofar as organization, expense and methods of operation are concerned.

2—Supervision over the weighing of less than carload freight.

3—The adoption and application of mechanical devices; the working out of other plans for economical and efficient operation and the establishing of uniform station methods where practicable.

4—The policing of all station and transfer tonnage and the application of proper minima for the establishing of through destination cars and classifications or schedules for the movement of less-than-carload freight.

5—The adoption and employment of methods to govern the general handling of less-than-carload freight, and the overcoming of causes responsible for freight claims by locating and removing defects in station operation.

6—Keeping informed as to the details of operation and expense of freight stations and transfers, making suggestions and recommendations in the interest of efficiency, improved service and uniformity of practices.

7—Securing maximum efficiency in the handling of carload freight, through the adoption and employment of improved methods of loading in order to prevent loss and damage to contents.

He should be authorized to issue such instructions to the general and division superintendents as may be necessary in the discharge of the above duties, and he should have a sufficient number of experienced inspectors to make at least a quarterly inspection of all stations. I think each division superintendent should have a supervising agent, reporting direct to him, with supervision over the agents and their forces. The supervising agent's duties should embrace the inspection of the station, the organization, the expense, the enforcement of rules, the policing of less-than-carload freight and the correcting of conditions causing expense in the way of operation and freight claims. He should inspect all stations on his division as frequently as possible. These inspections should be independent of inspections made by the representatives of the central officer. The supervising agent should make a report of his inspection to the division superintendent and a copy should go to the superintendent of stations and transfers. Where unable to apply corrective measures the recommendations necessary for the same should be included in his reports.

Inspectors should be sent simultaneously to each local division, should be accompanied by the trainmaster or division supervising agent, and should thoroughly check each station on the division. This inspection should be somewhat after the following order and should cover a thorough check of the station operation and relative yards. The inspection of the station should embrace: 1—The acceptance, trucking and stowing of l. c. l. freight. 2—The preparation and dispatch of waybills. 3—The unloading and delivery of l. c. l. freight. 4—The over, short, damaged and refused freight. 5—The claims covering loss and damage to freight. 6—The policing of platforms and stations. 7—The movement of cars between yards and stations. 8—The matching of over and short freight at common points. 9—The delivery receipts from date of previous inspection to see that the proper signature has been obtained for freight delivered. 10—All freight on platforms and in warehouse to see that it matches against freight bills and exception reports. A record should be maintained of all irregularities developed for future reference. 11—The yards to ascertain if any delayed cars are on the team, hold bad order, transfer, or other tracks. 12—The selection of proper equipment to transport and protect without loss or damage to carload or less-than-carload freight, the elimination of rough switching and handling of trains, the avoidance of delays and any other causes which may enter into the question of prevention of freight claims.

After the above inspection is completed on a division a meeting should be called, to bring together the general superintendent, who should act as chairman, the superintendent of stations and transfers, the freight claim agent, the division superintendent, the trainmaster, the division supervising agent, the division special officers or police, the master mechanic and the inspectors who made the checks and investigations. Any irregularities developed on that division should be discussed separately and the claim causes on such division generally determined. The officer should present for discussion at this meeting, claim statistics of the division involved, as well as the collective and individual deficiencies which his reports and investigations may have developed. The general superintendent, immediately following the meeting, should see that necessary instructions are issued to correct the irregularities discussed, and that the remedy is applied. After doing so, he should make a report in the minutes of the meeting which should be sent to the general manager. The investigations and proceedings above described should be continued from one division to another until the entire railroad is covered. The operation should then be repeated, but not necessarily in the same division order. It has been my experience that it is wise to go back to the division which has made the worst showing as soon as practical. With this practice it is possible to determine whether the proper corrective measures have been effective and whether those responsible for the carrying out of instructions are thoroughly posted and understand just what is to be done.

It has been my pleasure to have had a small part in the working out of the program which has been outlined above and of having the satisfaction of seeing what it has accomplished on two different trunk line railroads. When the program was first initiated everybody said that they would not have time to fool with it and that it was too intricate. Strange to say, when it was made effective the most astounding conditions were uncovered by the investigations and we found that after all the adoption of the plan eliminated far more trouble and work for the bosses than it brought upon them. The recompense came in seeing a bad situation changed to a perfectly healthy and normal situation, and one of which all the supervisors could justly be proud.

THE SOUTHERN PACIFIC, as a means of disseminating information to the public on a scale which can be readily understood, has reduced figures of cost of operation to a minute basis. The Southern Pacific, every minute of the day last year, hauled 27,742 tons of freight one mile and carried 3,786 passengers one mile. Every minute also called for an operating expenditure of $410.21, of which $265.19 went for wages. Sixty times every hour the company expended $40.48 for taxes, paid out $158.08 for equipment, extensions and betterments and had other miscellaneous liabilities totalling $81.18.

General News Department

The Chicago Great Western has granted wage increases of two cents an hour to shopmen.

The Chicago, Rock Island & Pacific has pensioned a total of 1,104 employees since the establishing of the pension department on January 1, 1910, and has paid these employees a total of $2,389,591. At the present time there are 657 living employees receiving pensions. The highest pension paid is $150 a month and the lowest $20. During 1926, 84 employees were pensioned and their service represented a total of 2,903 years.

Four employees of the Pennsylvania Railroad have been awarded prizes of $50 each for plans to provide the organization for a "New Ideas Bureau" which the company wishes to establish, for the purpose of improving the service generally. The four employees are Charles Weiss, assistant supervisor, Philadelphia Terminal division; Samuel L. Sanderson, track laborer, Pittsburgh division; R. C. Keene, signalman, St. Louis division; and R. M. Nolan, clerk, office of works manager, Altoona. The total number of plans submitted was 278, and 16 other employees, occupying a great variety of positions, are accorded honorable mention.

The Wheeling & Lake Erie has filed with the Interstate Commerce Commission a revised brief in connection with the Wheeling & Lake Erie valuation case in compliance with the direction of Division 1 of the commission striking from the commission's records the brief filed by attorneys of the Bureau of Valuation and the reply brief for the railroad, on the ground that they contained "scandalous" and "disrespectful" language. The Bureau attorneys filed their expurgated brief some time ago. The revised railroad reply brief is 369 pages as compared with 397 pages in the brief objected to, indicating that 28 pages were unnecessary after the Bureau had pasted strips of adhesive tape over certain passages in its brief.

The Norfolk & Western announces that its automatic train control installation between Shenandoah, Va., and Roanoke, 132 miles, is finished, and will be put in operation this week. With the completion of this work, done under the second order of the Interstate Commerce Commission, the Norfolk & Western has complete automatic block signaling and automatic train control between Hagerstown, Md., and Roanoke, Va., 238 miles, single track. The first train-control installation was completed in February, 1925. Prior to that time, the manual block system was in use on this line. Under the second order numerous modifications and refinements have been introduced, materially simplifying the apparatus as compared with that between Hagerstown and Shenandoah. The train-control system is the Union continuous speed control.

A Relief and Loan Plan for Shopmen

The General Electric Company, Schenectady, N. Y., has established, for the benefit of employees who may be temporarily idle, due to lack of work, or who may need special relief because of illness in the family, a relief and loan plan, designed to make loans of money up to $200 without interest. Repayment is to be made by deduction from wages when work is resumed, ten per cent of the pay to be paid each week.

Acceding to the wishes of the majority of the employees who have been in the service one year or more, the company adopted the plan and also agreed to contribute to the fund a sum equal to that contributed by the employees, who are to pay 50 cents a month. It is proposed to allot five cents of this sum to relief and 45 cents to the unemployment loan fund. An employee member of the fund who retires on pension or otherwise will have paid back to him the money which he has put in, plus interest at five per cent. The fund will be administered by a committee appointed equally by the contributors and the management.

A Correction

The handling of l. c. l. freight by means of trailers mounted intact and securely interlocked on flat cars of the North Shore Electric was described in an article on page 939 of the November 13 issue of the *Railway Age*. In the first sentence of the last paragraph the capacity of these trailers, or "trailmobiles" as they are called, was given as 18 tons and the word "container" used in a way which might indicate that the bodies were of the demountable container type. The facts are that the trailmobiles are of eight tons' capacity each and the all-metal bodies are riveted in place, except the 26 bodies of the original equipment which are being removed from the trailers of another make and remounted on interlocking semi-trailmobile chassis in Chicago. These 26 chassis and the 22 new chassis were manufactured by the Trailmobile Company, Cincinnati, Ohio.

Motion-Picture Safety Lessons on the Illinois Central

The Illinois Central is operating a traveling "movie" for the promotion of safety, and has fitted up a "white coach," on the outside of which are lettered numerous safety slogans. The car is being operated over the system, giving lectures. At each stop the car is parked near the station. It is painted a dazzling white and all over it, in marked contrast, are the safety slogans, lettered in black. The upper panes of the windows are also utilized for this purpose. Inside the car there is a complete

Slogans Are Displayed on the Car

equipment for a motion picture show. The car has seats for 56 spectators.

Free shows are given both to the public and to railway employees. The films deal with accidents to children, trespassers, passengers and automobile drivers, as well as to careless employees. The car, the idea for which was originated by G. E. Patterson, general manager, and which is being managed by J. D. White, superintendent of safety, is scheduled to visit 88 division points and districts terminals on all parts of the system.

Canadian Clerks' Wage Negotiations

Representatives of 6,000 railway clerks, freight handlers and station employees of the Canadian Pacific are negotiating with the company in Montreal on requests made for increases in wages and changes in working conditions. The proposed increase for all hourly-rated employees is 10 cents per hour and for all monthly-rated men of $20.40.

The employees, who are members of the International Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees, submitted their demands some weeks ago and as no settlement was arrived at, a board of conciliation and investigation was applied for. The board was subsequently established, D. R. C. MacLean was appointed chairman of the board by the Minister of Labor, in the absence of a joint recommendation from the other two appointees. David Campbell, K. C., Winnipeg, for the men, and J. B. Coyne, Winnipeg, for the com-

pany. Arrangements had been made for proceeding with the case before the board on December 13, but a recent conference between George Hodge, assistant general manager, Eastern lines, Canadian Pacific, and F. H. Hall, Canadian vice-president of the Brotherhood of Railway and Steamship Clerks, resulted in an understanding that there should be a further effort to adjust the differences prior to the board meeting.

Bridge to Span Hudson at New York Approved

Plans for a huge suspension bridge to span the Hudson river between Fort Washington, New York City, and Fort Lee, N. J., have been approved by the War Department. The bridge will be constructed by the Port of New York Authority; tolls will be charged and the bridge is expected to pay for itself and amortize the cost of construction. The states of New York and New Jersey have each voted $5,000,000 toward the work. Other financing will be done directly by the Port Authority by the sale of its bonds, $20,000,000 of which have already been sold. These bonds will constitute a prior lien on the bridge, after which the advances by the states will be repaid. This method of financing the Port Authority's work has met with success in two other bridge projects connecting Staten Island, New York City, with the Jersey mainland. The total cost of the Hudson bridge is estimated at $50,000,000.

The Port Authority will shortly advertise for bids on preliminary construction work. The new bridge will have a span of 3,500 ft. and a minimum clearance over the river of 207 ft. Towers on either shore supporting the cables will be 600 ft. high. Highway traffic alone will be provided for in the original construction but accommodations for railway tracks will be added later if there is any demand for them.

Angle-Cock Closed—No Explanation

The closing of an angle-cock in a passenger train brake pipe sometimes causes disaster—and sometimes not. The Halifax (N. S.) Herald, reporting a recent incident on the Canadian National, says:

No. 3 train, the westbound Ocean Limited, ran wild down Truro grade (64 miles from Halifax) and into the yard at the rate of thirty-five or forty miles an hour this morning (Novem-

OPERATING REVENUES AND OPERATING EXPENSES FOR CLASS I ROADS FOR OCTOBER

(For 186 Steam Roads, Including 13 Switching and Terminal Companies)

Item	United States		Eastern District		Pocahontas Region		Southern Region		Western District	
	1926	1925	1926	1925	1926	1925	1926	1925	1926	1925
Average number of miles operated	237,173.71	236,601.23	59,366.96	59,478.66	5,554.94	5,544.47	39,046.80	38,748.53	133,205.01	132,829.57
Revenues:										
Freight	$471,477,574	$450,629,149	$201,791,156	$183,222,592	$24,079,701	$21,745,501	$59,410,823	$60,327,776	$186,195,894	$185,333,280
Passenger	a 82,082,334	b 86,528,489	42,307,216	42,032,919	1,718,345	1,855,941	11,156,042	13,828,213	26,900,731	28,811,416
Mail	8,016,277	8,040,854	3,088,129	3,069,204	198,251	202,503	1,168,255	1,190,832	3,561,642	3,578,315
Express	14,608,448	14,905,014	7,180,410	7,697,965	313,360	343,668	1,784,746	1,939,180	5,329,932	4,924,201
All other transportat'n	18,966,157	18,233,741	10,502,864	10,164,587	262,271	246,761	1,257,161	1,273,645	6,943,861	6,548,748
Incidental	13,071,738	12,450,840	6,493,421	6,552,890	529,199	355,724	1,327,146	1,340,758	4,721,972	4,201,468
Joint facility—Cr.	1,262,153	1,322,817	485,450	585,798	8,581	14,140	139,922	134,577	628,200	588,302
Joint facility—Dr.	440,105	578,015	148,754	311,478	3,265	1,715	35,141	39,126	252,945	225,696
Ry. operat'g revenues	609,044,576	591,532,889	271,699,892	253,014,477	27,106,443	24,762,523	76,208,954	79,995,855	234,029,287	233,760,034
Expenses:										
Maintenance of way and structures	79,341,689	77,181,285	34,434,267	32,952,806	3,851,333	4,194,905	11,544,742	11,174,597	29,511,347	28,858,977
Mainten'ce of equipm't	111,548,396	110,462,734	54,786,126	52,920,511	4,873,065	4,952,977	14,510,421	14,856,769	37,378,784	37,732,477
Traffic	9,737,394	9,098,288	3,670,056	3,429,364	243,467	244,314	1,727,024	1,644,457	4,096,847	3,780,153
Transportation	195,552,314	193,672,962	92,338,394	87,665,544	6,747,492	6,417,238	24,879,372	26,342,302	71,587,056	73,247,878
Miscellaneous operat'ns	4,807,347	4,848,056	2,257,730	2,293,833	85,830	89,644	494,538	565,463	1,969,249	1,899,116
General	15,387,713	16,495,849	6,872,075	8,348,702	520,044	475,122	2,033,418	1,904,076	5,962,176	5,767,949
Transportation for investmen—Cr.	1,472,481	1,312,479	233,698	145,339	78,404	110,978	243,385	270,975	916,994	785,187
Ry. operat'g expenses	414,902,372	410,446,695	194,124,950	187,465,421	16,242,827	16,263,222	54,946,130	56,216,689	149,588,465	150,501,363
Net revenue from railway operations	194,142,204	181,086,194	77,574,942	65,549,056	10,863,616	8,499,301	21,262,824	23,779,166	84,440,822	83,258,671
Railway tax accruals	37,368,740	33,916,007	14,886,789	12,945,817	2,076,385	1,723,604	5,072,423	4,933,060	15,333,143	14,313,526
Uncollectible ry. rev's.	127,433	184,417	50,546	72,730	3,440	26,508	17,980	20,843	55,467	64,336
Ry. operating income	156,646,031	146,985,770	62,637,607	52,530,509	8,783,791	6,749,189	16,172,421	18,825,263	69,052,212	68,880,809
Equipm't rents—Dr. bal.	8,432,268	7,773,295	3,606,600	3,145,855	d 452,411	d 745,032	227,292	902,679	5,050,787	4,469,793
Joint facility rent—Dr. balance	2,089,099	1,179,944	1,058,866	95,725	96,317	99,860	115,439	94,070	818,477	890,289
Net railway operating income	146,124,664	138,032,531	57,972,141	49,288,929	9,139,885	7,394,361	15,829,690	17,828,514	63,182,948	63,520,727
Ratio of expenses to revenues (per cent)	68.12	69.39	71.45	74.09	59.92	65.68	72.10	70.27	63.92	64.38

FOR TEN MONTHS ENDED WITH OCTOBER, 1926 AND 1925

Average number of miles operated	236,997.89	236,609.30	59,411.84	59,532.51	5,549.53	5,540.27	38,939.83	38,712.30	133,096.69	132,824.22
Revenues:										
Freight	3,994,227,253	3,772,599,131	1,761,621,762	1,660,831,849	208,886,771	184,854,855	549,902,693	518,783,141	1,473,816,027	1,408,129,286
Passenger	c876,128,294	c 883,215,537	440,659,819	437,139,449	18,442,929	19,219,365	128,380,294	128,777,577	288,645,252	298,079,146
Mail	78,399,417	79,261,148	29,837,526	30,364,846	2,038,444	2,057,133	11,761,536	11,427,123	34,761,911	35,412,046
Express	120,679,188	117,588,876	57,405,456	56,878,368	2,645,966	2,750,168	15,978,185	16,327,488	44,649,581	41,632,852
All other transportat'n	174,092,157	166,547,530	98,345,286	94,562,839	2,338,042	2,054,728	10,486,125	9,821,002	62,922,704	60,108,961
Incidental	112,703,745	105,939,924	56,162,664	52,295,926	4,385,164	3,439,714	13,151,350	12,212,723	39,004,567	37,991,561
Joint facility..Cr.	11,193,573	9,155,073	4,471,958	3,831,812	140,221	162,163	1,416,212	1,360,907	5,165,182	3,800,191
Joint facility..Dr.	4,037,139	2,552,507	1,348,985	866,595	23,217	22,384	341,669	348,472	2,323,268	1,315,056
R'y optg. revenues	5,363,386,488	5,131,754,712	2,447,155,486	2,335,038,494	238,854,320	214,515,742	730,734,726	698,361,489	1,946,641,956	1,883,838,987
Expenses:										
Maintenance of way and structures	732,535,796	694,873,097	311,188,969	294,682,183	32,835,287	31,755,443	106,501,595	99,266,492	282,009,945	269,168,979
Mainten'ce of equip't	1,074,267,793	1,056,001,961	519,535,317	507,613,530	48,778,238	49,452,843	141,267,128	134,475,991	364,687,110	364,459,597
Traffic	94,910,790	87,775,242	34,864,020	32,666,969	2,484,132	2,284,036	16,912,789	15,603,829	40,649,849	37,220,408
Transportation	1,818,292,327	1,790,345,863	859,386,039	837,985,265	62,044,723	58,915,359	250,868,972	239,257,250	645,992,593	654,187,989
Miscellaneous operat'ns	47,244,092	44,961,611	21,751,750	20,346,358	905,861	883,063	5,624,945	5,258,844	18,961,536	18,473,346
General	153,675,720	146,642,442	70,353,560	65,896,399	5,074,511	4,655,423	20,041,558	18,876,834	58,206,091	57,213,786
Transportation for investment .. Cr	13,392,263	10,447,413	1,710,998	1,614,604	518,856	588,693	2,468,785	1,907,487	8,693,624	6,336,629
R'y opert'g expenses	3,907,534,255	3,810,152,803	1,815,368,657	1,757,576,100	151,603,896	147,357,474	538,748,202	510,831,753	1,401,813,500	1,394,387,476
Net revenue from railway operations	1,455,852,233	1,321,601,909	631,786,829	577,462,394	87,250,424	67,158,268	191,986,524	187,529,736	544,828,456	489,451,511
R'y tax accruals	329,388,745	299,744,152	136,930,453	123,753,291	17,258,736	13,206,557	44,923,841	41,587,978	130,275,715	121,196,326
Uncollectible r'y rev's.	1,317,008	1,491,857	631,559	717,546	32,161	72,671	163,000	186,602	490,288	515,038
Ry. opt'g. income	1,125,146,480	1,020,365,900	494,224,817	452,991,557	69,959,527	53,879,040	146,899,683	145,755,156	414,062,453	367,740,147
Equipm't rents—Dr. bal.	69,714,327	64,971,312	36,931,097	34,727,424	d 5,723,529	d 5,607,874	9,355,513	7,004,173	29,151,246	28,847,589
Joint facility rent—Dr. balance	19,931,692	18,401,424	9,328,635	8,203,123	970,516	916,269	1,138,232	1,109,511	8,494,309	8,172,521
Net railw'y operating income	1,035,500,461	936,993,164	447,965,085	410,061,010	74,712,540	58,570,645	136,405,938	137,641,472	376,416,898	330,720,037
Ratio of expenses to revenues (per cent)	72.86	74.25	74.18	75.27	63.47	68.69	73.73	73.15	72.01	74.02

a Includes $3,436,784 sleeping and parlor car surcharge. b Includes $3,657,779 sleeping and parlor car surcharge. c Includes $35,012,015 sleeping and parlor car surcharge. d Deficit or other reverse item. e Includes $33,230,012 sleeping and parlor car surcharge.

Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to revision.

ber 16) while passengers in the train and people on the station platform were in a panic, not knowing what would happen next.

At the top of the grade Engineman Robert Hamilton found that the brakes would not work. He warned the trainmen by the whistle, but meantime the train was rushing down the hill, gathering speed.

Men in the yard caught on and set the switch for a clear straight line. The trainmen applied the emergency brakes from inside the cars, and the outfit was brought to a standstill suddenly midway of the yard, causing much commotion among the passengers; but no person was injured. Investigation showed that an angle-cock between a car of fish and the locomotive was wrong, which cut off the air.

The brakes were working at Milford, the last stop, and just how the angle-cock became wrong is the question.

Wage Statistics for September

The total number of employees reported to the Interstate Commerce Commission by Class I railroads as of the middle of September, 1926, was 1,855,193, which is practically the same as was reported for the previous month, but owing principally to the fact that September had one less working day than August, the total compensation, $254,264,521, shows a decrease of $2,496,847, or one per cent.

Compared with the returns for the corresponding month last year, the number of employees shows an increase of 2.9 per cent, and the total compensation an increase of 4.1 per cent.

The table shows the percentage relation of the pay rolls of 20 leading railway systems for September to total pay rolls of all Class I railways, excluding switching and terminal companies. Included in these systems are their Class I subsidiary railways, but not switching and terminal companies, except three which could not be separated from the system report. In a small number of cases roads of Classes II and III are included in the system report.

SEPTEMBER, 1926

Name of Road	Amount of Pay Roll	Per Cent of Total
Pennsylvania System	$32,458,870	12.9
New York Central Lines	24,644,710	9.8
Southern Pacific Lines	12,202,280	4.9
Atlantic Coast Line System	12,081,277	4.8
Baltimore and Ohio System	10,528,360	4.2
Illinois Central System	9,613,912	3.8
Atchison System	9,114,828	3.6
Southern Railway System	8,330,006	3.3
Chicago & North Western System	8,117,630	3.2
Missouri Pacific System	7,894,775	3.1
Union Pacific System	7,795,583	3.1
Chicago, M. & St. Paul	7,292,663	2.9
Burlington	7,186,190	2.9
New Haven	5,737,086	2.3
Chesapeake & Ohio System	5,334,419	2.1
Chicago, R. I. & Pacific System	5,298,245	2.1
Erie System	4,633,697	1.8
Great Northern	4,350,039	1.7
Norfolk & Western	4,274,163	1.7
Northern Pacific	3,854,108	1.5
Total 20 Railways	190,742,841	75.7

Improvements in Ticket Selling at Pennsylvania Station, New York

At the Pennsylvania Station, New York City, the space devoted to ticket selling has been enlarged about 30 per cent and passengers now buy both railroad and sleeping car tickets at the same window, as has been the practice at the Grand Central Terminal, New York, for several years past. Each ticket seller is also equipped, like those at the Grand Central, with an individual ticket case (which includes his money drawer) so that when he goes off duty, he can lock up his tickets and money and roll the case back, making room for the man (with an individual case) who takes his place.

The Pullman diagram room, where all sleeping and parlor car space is allotted, has been trebled in size and its wire facilities doubled. The number of operators here has been increased and this room now takes care of about 10,000 telephone transactions daily. This room also has its own telegraph office employing four operators for communication with places at a greater distance than is covered by ordinary telephone communication. About 420 Pullman cars now depart from the Pennsylvania station every 24 hours.

The diagrams of Pullman cars, about eight minutes before the departure of each train, are sent to the station platform through a pneumatic tube, and before being sent, each diagram is reproduced by photostat process. For example, the ten cards for a train of ten Pullman cars are spread out on a sheet and photographed; and this photostat, about 30 in. square, is filed as a record of the transactions of the office for that train.

Incidental to the enlargement of the ticket-selling space, the public telephone booths, greatly increased in number, have been moved into the main concourse.

A passenger can now get a ticket to any point, including sleeping car space, at any ticket window, except at a short section on one side where only local tickets are sold.

Railroad Matters in Congress

The bill to provide for the refunding of railway indebtedness to the United States government has been placed second on a program of legislation to be considered by the Senate, announced on December 13 by Chairman Wadsworth of the committee on order of business of the Senate Republican conference. It follows the rivers and harbors bill, which came up for consideration under a special order on December 14. The Senate on December 10 passed the bill introduced by the late Senator Cummins prescribing penalties for the transportation of stolen property in interstate commerce.

Opposition to the metric system was expressed at a hearing before the Senate commerce committee on December 11 by Alfred P. Thom, Jr., appearing for the Association of Railway Executives, the American Railway Association and the American Railway Express Company. Mr. Thom said that railway operation is based on the English system of weights and measures and that adoption of the metric system in this country would entail undue cost and confusion, out of all proportion to the possible benefits to be derived. The hearing was held on Senate joint resolutions introduced by the late Senator McKinley and by Senator Gillett.

Three new members of the Senate committee on interstate commerce have been appointed to fill vacancies. The new Republican members are Senators Metcalf of Rhode Island and Dupont of Delaware, while Senator Hawes of Missouri, who was a member of the House committee on interstate and foreign commerce at the last session, was appointed to fill the Democratic vacancy.

Bird M. Robinson, president of the American Short Line Railroad Association, and other representatives of the short lines, appeared before the Senate committee on interstate commerce on December 14 in support of the bill introduced by Senator Pittman to exempt "short lines" from the provisions of the recapture provisions of the transportation act. He pointed out that whereas it was intended that the recapture fund should be used for the assistance of short or weak lines, thus far the short lines have been almost the only contributors to the fund, and that the benefits intended for weak lines have not come about. He contended that lines which for a short time have had large earnings for some exceptional cause ought not to have the excess taken from them but should be allowed to retain it against the time when the earnings would be less favorable.

The hearing was continued on December 15, when the following spoke briefly in support of the bill: Clarence M. Oddie, vice-president, and Ben B. Cain, vice-president and general counsel of the American Short Line Railroad Association; W. L. White, of the Yosemite Valley; J. A. Demeke, of the Gideon & North Island; J. E. DuPont, of the Pearl River Valley; R. B. Coleman, of the Georgia, Florida & Alabama; W. E. Streng, of the Campbell's Creek; Edward S. Hughes, of the Roscoe, Snyder & Pacific; D. P. White, of the De Kalb & Western; J. A. Sisk, of the Appalachian; C. M. Hamblin, of the Sierra; L. C. Sprague, of the Uintah, and W. M. Cannon, of the Louisiana & Northwest. Each told the committee of the peculiar conditions faced by his road, and many of them spoke of some special source of traffic which greatly increased the earnings of the road for a year or two although its normal condition may have been one of deficits, saying that it did not seem fair that they should not be allowed to retain the full amount to offset the less favorable years. One road had had a deficit for five years and then had recapturable earnings in one year.

THE CHICAGO, SPRINGFIELD & ST. LOUIS, formerly the Chicago, Peoria & St. Louis, resumed freight service between Springfield, Ill., and Alton, on December 10. Passenger service with gasoline coaches will also be resumed within a few days.

Traffic News

A petition filed by eastern carriers with the United States District Court in Chicago, seeking to prevent the enforcement of an order of the Interstate Commerce Commission to equalize toll charges on freight carried over bridges between St. Louis, Mo., and East St. Louis, Ill., was dismissed by order of the court on December 8.

The new passenger station of the Boston & Albany at Springfield, Mass., under construction for the last two years, has been sufficiently completed to be put in use, and will be opened for business on Sunday, December 19. This is the union station of the Boston & Albany, the Boston & Maine and the New York, New Haven & Hartford.

The Merchants' Association, 233 Broadway, New York City, has prepared a map showing the public warehouse facilities of New York and vicinity, including all commercial warehouses and cold storage houses. There are 161 establishments. These have a total of 19,000,000 sq. ft. of floor space for merchandise and 3,000,000 sq. ft. for cold storage. Details are given of the facilities, size and financial standing of the different establishments.

By arrangements just made with the Pennsylvania for stopping a fast train which leaves the Pennsylvania station in New York at 11 a. m., at New Brunswick, N. J., the air mail terminal, the dispatch of transcontinental air mail is set one hour and 35 minutes later, it is announced by the Post Office Department. Under the former schedule, mail destined for air mail dispatch left the Pennsylvania station by train at 9:35 a. m. The arrival time in San Francisco will be 4:30 p. m., the following day, as at present.

The Supreme Court of the United States, in a decision rendered on December 13, sustained an order of the Interstate Commerce Commission of March 10, 1925, directing the establishment of rates on coal from the New River, Tug River and Pocahontas districts westbound via the Virginian and the Chesapeake & Ohio on a basis calculated to remove a discrimination complained of by mines located on the Virginian which were not given through rates westbound via the C. & O. The Virginian, which had adhered to the policy of providing transportation only to tidewater for the output of mines on its lines, had appealed from the commission's decision.

The Boston & Maine has issued its annual bulletin, "Winter in New England," giving a large amount of descriptive matter concerning places in Maine, New Hampshire, Vermont and Massachusetts where winter sports are provided. The basis of this book is a list of 200 hotels which cater to this class of business. The number of places providing accommodations for winter sports is 15 per cent larger than in former years. A list is given of a score of places, with dates, at which winter carnivals of various kinds are planned for the season from January 20 to February 22; and a dozen other towns are named which expect to announce amusements if snow conditions are favorable. The Boston & Maine offers reduced round-trip fares to many of these winter sport resorts.

The cost of the so-called "all-American" waterway from the Great Lakes to the ocean which requires a canal from Oswego, N. Y., to the Hudson river suitable for vessels of 25 ft. draft, was estimated at $506,000,000 in a report which has been submitted to the House rivers and harbors committee by Major General Edgar Jadwin, chief of engineers of the U. S. Army. This report held that the proposed St. Lawrence river waterway, with its power possibilities, would be far more economical. Improvement of the St. Lawrence route for navigation alone, excluding the expenditures to be defrayed by the power projects, would cost only $173,520,000, says the report, while the cost can be divided between this country and Canada if the project can be worked out on a basis satisfactory to the governments of the United States and the Dominion.

Air Transportation Growing

Secretary Hoover estimates that 10,000 miles of airways will be in active private operation by July 1 as compared with an estimate made by the Commerce Department some time ago of 4,000 miles by that time. For this reason the department has been obliged to increase its estimate of the funds needed for providing adequate ground service under the new aeronautics act. There is every prospect, Secretary Hoover said, that this country will have the only profitable air service in the world, without government subsidy, and he expressed the opinion that the basis of air transportation in this country would be the carriage of mail and express, with passenger traffic as a side line, whereas in Europe the passenger traffic, which costs more for operation, is the principal factor.

New Pennsylvania Express Terminal at New York

The Pennsylvania has just completed at Sunnyside, Long Island, about four miles east of the Pennsylvania station, New York, a large new building for the use of the American Railway Express Company, the building, tracks and other facilities representing an expenditure of more than $2,000,000. The plant includes modern devices for handling express merchandise traffic efficiently. The express company is vacating the space used by it at the Pennsylvania (passenger) station and also its building at Pier D, Jersey City.

The removal of this business to Long Island will relieve vehicular traffic congestion in the streets adjacent to the Pennsylvania Station, Seventh avenue and 32nd street.

The platform tracks at the new station number six, and will accommodate 84 cars. The four loading platforms are respectively, 77 ft. by 750 ft.; 30 ft. by 850 ft.; 30 ft. by 900 ft. and 30 ft. by 1,000 ft. The total area of the plant, exclusive of driveways, is about 75,000 sq. ft. and the back-up space for vehicles aggregates 2,100 ft. in length, so that nearly 300 vehicles can load or unload at one time. On the second floor of the building, there is 4,200 sq. ft. of office space. This will be the largest plant of its kind in the country used by the express company.

Maritime Commission Recommends Immediate Rate Reduction

The Royal Commission on Maritime Claims was tabled in the House of Commons at Ottawa last week. Some of the points raised in the report of the commission dealing with freight rates in the Maritime provinces may provoke some lively exchanges in the House this session. Following are some of the important observations of the commission on this subject:

"We conceive this to be a position with which—quite apart from details of particular rates—it is our function to deal, and a position which must be dealt with drastically and promptly. We take this view the more readily since the president of the Canadian National Railways system did not dissent from Sir Sanford Fleming's railway estimate that, for strategic reasons, the Intercolonial had followed a course approximately 250 miles greater than would have been followed had it been built merely for commercial purposes. He further explained that, owing to grades and curvature, the operating and maintenance expenses of this branch of the railway were much greater than the average of the rest of the system, and, still further, that winter conditions in the Maritime provinces necessitated special expenditure arising from snow and ice conditions—and consequent delays in traffic transit—much in excess of what were experienced in other parts of the system. It is true that the operation of the Atlantic division has shown an operating deficit in recent years in spite of the higher rate structure (including general war increases) that has been imposed on it since 1912. But there are many considerations to be taken into account in considering that deficit. For our present purpose, it is more material to notice that the president of the Canadian National Railways admitted in evidence, that in administering the Atlantic division (the greater portion of which is the old Intercolonial system), no account is being taken in the rate structure of today of the special considerations which attach to it as revealed in the pledges and pronouncements already referred to. We feel that the increase arising from the changes that have taken place in freight rates since 1912—over and above the general increase that has taken place in other parts of the National system—is as fair a measure as can be made of

these special considerations, and accordingly should be transferred from the Maritimes to the Dominion so that the original intention may be observed.

We recommend, therefore, that an immediate reduction of 20 per cent (so that 192 will become approximately 155) be made on all rates charged on traffic which both originates and terminates at stations in the Atlantic division of the Canadian National Railways (including export and import traffic, by sea, from and to that division), and that the same reduction be also applied to the Atlantic division proportion of the through rates on all traffic which originates at stations in the Atlantic division (excluding import traffic by sea), and is destined to points outside the Atlantic division.

"For this purpose, we cannot regard the Atlantic division as ending at Riviere du Loup and Monk, which are its present western limits. The divisional points should, in our view, be Diamond Junction and Levis, Diamond Junction being the point at which the Transcontinental Railway meets the old Intercolonial Railway, and Levis the point to which, in 1879, the Intercolonial Railway was extended.

"It might be contended that a flat rate reduction of the amount we name, and in the manner we name, is open to the objection, that it does not restore the pre-1912 relativity of rates within the provinces themselves, and that it is not an accurate assessment of the charges that arise from the considerations in mind. We do not believe—and the Canadian National Railways have informed us that they also do not believe—that any more accurate or equitable result could be obtained by minute and scientific investigation, which would, in any event, take an indefinite time to conduct. The situation is one that can only be dealt with in a broad spirit, and one that for the economic welfare of the Maritimes must be met without delay. The course we suggest has the effect of giving immediate relief in a manner that is equitable as well as broad. The cost of this relief should be definitely borne by the Dominion government, who will make the necessary reimbursement to the Canadian National Railways through the medium of the Canadian National Railways Budget, without impairing the financial results of the operation of the system. We are not overlooking that the other great railway system operating in the area would be entitled to equitable consideration if they find themselves prejudiced as a result of the reduction proposed."

Freight Traffic in October

The freight moved by the railroads in October this year, according to compilations made by the Bureau of Railway Economics, amounted to 48,273,089,000 net ton miles. This exceeded by 3,944,912,000 net ton miles, or 8.9 per cent, the best previous record for any month, which was established in September.

October showed an increase of 4,219,546,000 net ton-miles or 9.6 per cent over the same month last year, and an increase of 5,139,266,000 net ton miles or 11.9 per cent over the same month in 1924.

In the Eastern District there was an increase of 15 per cent in the net ton miles, in the Southern an increase of 2.1 per cent and the Western 5.5 per cent.

During the first ten months this year freight traffic amounted to 405,131,386,000 net ton miles, which was an increase of 19,107,698,000 net ton miles, or 4.9 per cent, over the previous high record, for the corresponding months in 1923. This was also an increase of 7.3 per cent over the corresponding period in 1925 and an increase of 13.6 per cent over 1924.

For the ten months, the railroads in the Eastern district showed an increase of nine per cent, while the railroads in the Southern district showed an increase of 7.1 per cent. The roads in the Western district made report of an increase of 5.1 per cent.

The daily average movement of freight cars in October was 34.3 miles, the highest average ever reported for any one month. This exceeded by 1.6 miles the best previous record, established in September this year, 32.7 miles. The average for October was an increase of two miles over that of October last year and of 3.7 miles over that of October, 1924. For the first ten months this year, the daily average movement per car was 30.4 miles, compared with 28.2 miles for the same period last year.

The average load per car in October was 27.5 tons, an increase of 1.2 tons over that for October last year and an increase of two-tenths of a ton above that of the same month two years ago.

Commission and Court News

Interstate Commerce Commission

Alleging that the Northern Pacific and the Oregon-Washington Railroad & Navigation Company have entered into a secret agreement not to extend their railway facilities to Asotin county, Wash., the Chamber of Commerce of Clarkston, Wash., has filed a complaint with the Interstate Commerce Commission asking an order requiring the two roads to extend their facilities to Clarkston, on the Snake river, opposite to Lewiston, Idaho, where they have terminals. It is stated that the two roads now own right of way and terminal sites in Clarkston and that the expense involved would not be disproportionate to the traffic, actual and prospective, of the county.

Western Rate Hearing

The Commission has announced a change in the date of the initial hearing at Omaha, Neb., in its Rate Structure Investigation, Part 2, Western Trunk Line Class Rates, and other cases to be considered with it, from January 11 to January 25. Referring further to the scope of the hearings the commission says in its notice that evidence will be received bearing upon freight rates constructed by the combination of class and commodity rates, concerning the competitive condition existing as to any commodity which moves on class rates in one locality and commodity rates in another, and exceptions to the classification. At the initial hearing the carriers at present contemplate adopting the following order of presentation: (1) Western trunk line rates, including their proposals, accounting, traffic and operating testimony, as well as intrastate situations in the various states; (2) rates to and from official territory; and (3) rates from and to southern territory.

Personnel of Commissions

A. G. Mott, chief transportation engineer of the Railroad Commission of California, has been appointed chief engineer, succeeding Lester S. Ready who has resigned to engage in private engineering work.

President Coolidge has sent to the Senate the nomination of Hywel Davies for re-appointment as a member of the United States Board of Mediation for a five-year term. His original appointment was for a one-year term.

W. A. Delzell has been appointed as a member of the Public Service Commission of Oregon to fill the unexpired term of Thomas K. Campbell, deceased. Louis Bean, newly elected to the commission, will take office on January 1.

It was stated at the White House on December 14 that the President has not yet reached any decision as to the re-appointment of Frederick I. Cox of the Interstate Commerce Commission, whose term expires at the end of the year. Senator Reed of Pennsylvania is conducting an active campaign for the appointment of a commissioner from his state and is understood to have proposed two candidates, William D. B. Ainey, chairman of the Public Service Commission of Pennsylvania, and Cyrus Wood, former ambassador to Japan. The latter called at the White House on December 14.

President Coolidge is expected to send to the Senate shortly a reappointment of Commissioner Frederick I. Cox for another term as a member of the Interstate Commerce Commission, as his present term expires at the end of this year. The President is understood to have given some kind of a promise to Senator Reed of Pennsylvania, who has been campaigning for the appointment of a commissioner from that state, that the next vacancy on the commission would be filled from Pennsylvania or from the Southeast, but the word "vacancy" is not interpreted as applying to the expiration of a term, because of the traditional custom of reappointing members of the commission.

Foreign Railway News

London to Tokio on One Ticket

The European Railway Conference which has just concluded a session in Baden-Baden has formed a new combination which embraces transit over thirteen countries from France to Japan. It will soon be possible to obtain railway tickets in all the capitals of Europe direct for Tokio. The journey can be either through Riga or Warsaw and Moscow and it will take about twelve days. The traveler will have to advance his watch by one hour a day seven times during the transit.

New South Wales Railways Have Deficit for Year

The railroad commissioners for New South Wales, in reporting for the year ended June 30, 1926, show that the railways had a deficit of £803,671 after interest to the amount of £5,249,410 had been charged against earnings of £4,419,039. The deficit compares with the surplus of £32,937 for 1925. The report indicated that the increased working expense was due to increases in wages paid to workers, £586,195 being the amount of the total increase in working expenses due to higher wages. The train mileage for the year totaled 24,624,915, or increase of over 1,300,000 miles over the previous year. The mileage consisted of passenger trains, 13,547,976 miles; mixed trains, 1,469,201 miles, and goods or freight trains, 9,607,818 miles. The commissioners reported a serious decline in the travel by ordinary passengers due to the increased use of the motor vehicles.

Electrification Brings Big Increase in Melbourne Suburban Traffic

So successful has been the electrification of the Melbourne suburban lines, says Modern Transport (London), that already passenger revenue has increased by £325,000, a sum sufficient to meet the interest on the capital cost of the conversion from steam operation; and this in spite of keen competition from tramways and omnibuses. Between 1918 and 1923 the number of suburban passengers advanced from a yearly total of 97 to 158 millions, an increase of 11 per cent per annum, as compared with an average annual increase of 4 per cent in the days of steam traction. Furthermore, it is realized that Flinders Street Station, Melbourne, could not, under steam conditions, have handled the present traffic, which has increased by 63.4 per cent since 1918. The motor coaches on this system are equipped with four 140 h.p. motors, and during peak periods 88 seven-car and 20 six-car trains are in service. Statistics show that the average speed of an electric train, including stops, is 20 miles per hour, but a maximum of 50 miles per hour is attainable, while the accelerative power of a seven-car train in normal operation is one mile an hour per second, as compared with 0.6 mile an hour per second on the former steam trains. Although some 360 miles of single track have already been converted, an extension of the electrified zone is under consideration.

New Zealand Railway Earnings

The New Zealand government railways, according to the report of J. G. Coates, minister of railways, for 1926, earned £1,992,334, which was reduced, after interest had been charged off and also appropriations for betterments, to an unappropriated surplus of £21,023. This latter figure compares with a deficit of £87,736 in 1925. The percentage of net earnings for capital invested was 4.35 as against 3.55 in 1925. The operating ratio was 76.45 in 1926 as compared with 78.46. The New Zealand railways reported 3,138 miles open for traffic in 1926 as against 3,085 miles open for traffic in 1925. The minister of railways, in his report, said that the result of the year's work must on the whole be considered to be very satisfactory. Nearly all classes of traffic showed an increase in both volume and revenue, due not only to the natural growth of business but also in a large measure to the spirit of enterprise which has actuated all rights of the staff in building up traffic and in giving service to transportation customers.

With relation to competition met from motor vehicles, the minister's report expresses the position of the government railways as follows:

"After developing and encouraging suburban traffic for many years at unremunerative fares, privately owned busses have come in and are catering for only that portion of the business which is profitable, leaving the low-fare, peak-load traffic to the railways. The question then arises whether to discontinue suburban passenger service and thus reduce cost of operating, or to go on the roads to regain that portion of a passenger traffic which has been lost, so as to enable the railways to continue to render to the community that wider general service which has been their aim."

Train service, according to the report, has been accelerated throughout the territory of the government railways. Express trains between Auckland and Wellington, particularly, have been speeded up, and also trains between Auckland and Opua, between Maungaturoto and Whangarei. New arrangements insure daily service between Opua and Auckland; and, incidentally, a continuous through service between Opua and Wellington. The faster service affords business people in the far north an opportunity of travel to Whangarei and back on the same day, allowing a few hours for the transaction of business. It was indicated by the report that the rail motor car, while not unsatisfactory as a vehicle, had proved to be unsuitable to service on the main line. Some of the cars in question have been transferred to branch-line service where it is expected they will be more suitable.

Australian Railway Earnings

The report of the government railways of western Australia for the year ending June 30, 1926, shows earnings amounting to £3,337,292, a decrease of £22,209 as compared with the earnings for 1925. After paying working expenses and interest there was a deficit of £31,982. This figure does not include provision for sinking fund for redemption of loaned moneys spent on capital account. This provision for 1926 amounted to £126,000. The deficit of £31,982 was accounted for, according to the report, by the increase in rates of pay to the staff and the reduction in hours of work; also to a coal strike and the increased interest bill. A reduction in rates was also held responsible for the decrease in earnings.

The report indicated that passenger traffic continued to decrease. The total number of passenger journeys was 16,457,719, or 738,953 less than in 1925. The decline in passenger traffic was reported to be partly due to motor competition. To cope with this competition, additional trains were run and better service given with the result that there was some increase in passengers carried but the number did not materially affect the earnings owing to the small fare operating. The report, in remarking upon the subject of motor competition, said that the railways were not opposed to the use of the motor vehicle in every form. It was admitted that the farmer and traveler over short distances benefited materially through use of the motor truck and automobile. The report continued as follows:

"It is very evident that if the motor transport competition is allowed to operate on its present basis of charges, a reflex must ultimately be traced in an increase of railway charges on those commodities which at present are carried at exceptionally low rates. Our goods and livestock traffic was carried at an average rate of 1.91d. per ton per mile, and so long as such a result is achieved the country's development will go on unchecked. But this result will not be possible if our most profitable goods are carted by road; and if the people demand that the railways are to pay their way, then the only means of doing so will be to advance our rates on those commodities which are unattractive to our competitors. This means that the burden will fall on the low-priced raw material which plays such an important part in our primary and secondary industries."

Financial results of operating rail motor coaches indicated that there was a loss of £1,732 in the year ending June 30, 1926. This was explained as being due mainly to the extensive overhauling required during the year. When the coaches were first introduced they were fairly well patronized, many special trips being run in connection with sports gatherings and picnics. With the advent of road motor transport, however, service of motor coaches was not used as much as formerly, resulting in a great deal of idle time.

Equipment and Supplies

Locomotives

THE NEW ORLEANS GREAT NORTHERN is inquiring for two or three of each type of consolidation and Mikado locomotives.

Freight Cars

THE WESTERN UNION is inquiring for 20 steel underframes and trucks for box cars.

THE LEHIGH VALLEY has ordered 50, 30-cu. yd. extension side dump cars from the Clark Car Company.

THE CHESAPEAKE & OHIO is inquiring for 200 steel hopper bottom gondola car bodies of 70 tons' capacity.

THE FRUIT GROWERS EXPRESS has ordered 400 underframes from the Ryan Car Company. Inquiry for this equipment was reported in the *Railway Age* of December 4.

THE ATLANTIC COAST LINE has ordered 100 ballast cars from the Virginia Bridge & Iron Company. Inquiry for this equipment was reported in the *Railway Age* of November 27.

THE CHICAGO & NORTH WESTERN has ordered 25 caboose car underframes from the Bettendorf Company. Inquiry for this equipment was reported in the *Railway Age* of December 11.

THE ATCHISON, TOPEKA & SANTA FE is inquiring for 1,000 refrigerator cars. This company is also in the market for 1,950 other cars as was reported in the *Railway Age* of December 11.

THE NORFOLK & WESTERN has equally divided an order for 2,000 steel hopper coal cars of 70 tons' capacity between the Ralston Steel Car Company and the Virginia Bridge & Iron Company.

THE BUFFALO, ROCHESTER & PITTSBURGH, reported in the *Railway Age* of November 30 as asking for prices on the repair of 850 box and gondola cars, will make repairs at its own shops to 500 gondola cars and 350 wooden box cars.

Passenger Cars

THE CHICAGO, BURLINGTON & QUINCY has ordered one combination passenger and baggage gas-electric rail motor car from the J. G. Brill Company.

THE PENNSYLVANIA has ordered 30 multiple unit cars from the Standard Steel Car Company, 15 from the American Car & Foundry Company and 15 from the Pressed Steel Car Company. Inquiry for this equipment was reported in the *Railway Age* of November 20.

Machinery and Tools

THE NEW ORLEANS GREAT NORTHERN is inquiring for an 80-ft., 250-ton electrically-operated turntable for use at Jackson, Miss.

THE NORFOLK & WESTERN has ordered a 27-in. by 22-ft. time saver lathe and a Niles No. 2 bending roll, from the Niles-Bement-Pond Company.

Signaling

THE TEXAS & PACIFIC has ordered from the Union Switch & Signal Company a Saxby & Farmer interlocking for installation at the crossing with the Houston & Shreveport near Cut-Off Junction, La.; 12 working levers.

THE NEW YORK CENTRAL has ordered from the General Railway Signal Company, 14 color light signals, triangular, three-indication, for Elyria, Ohio; also 10 color light signals, type S, with other material, for Albany, N. Y.

Supply Trade News

A. C. Schleifer has been appointed mechanical engineer of the **E. A. Lundy Company,** Pittsburgh, Pa.

Joseph Beaumont has resigned as vice-president and director of the **Regan Safety Devices Company** to engage in other business.

The Vapor Car Heating Company, Inc., on December 1 removed its Boston, Mass., office to the Little building, 80 Boylston street.

The Keystone Steel & Wire Company, Peoria, Ill., has appointed **Theodore Geissman & Company,** Chicago, its district sales agent.

The Southern Wheel Company has purchased the car wheel plant at Hammond, Ind., of the New York Car Wheel Company of Indiana.

M. J. A. Bertin, managing director of the Société Anonyme des Huiles Galena, Paris, France, has been elected president of the parent company, **Galena Signal Oil Company (Pennsylvania),** with headquarters at New York, to succeed L. J. Drake, resigned. Mr. Bertin was born in Paris, France, and received his degrees in academic and engineering in Paris. He later took a special apprenticeship for four years at the Pennsylvania Railroad's Altoona shops previous to 1914. He returned to France to enter the war and served in the engineering corps of the French Army in all ranks from private to captain. He was assigned by Premier Georges Clemenceau to the air expeditionary forces as aid to General W. W. Atterbury and later represented the French G. H. Q. at the at the American G. H. Q., G4. He received the American distinguished service medal from General Pershing and between the time of the armistice and demobilization he served in the ministry of public works and railroads. Mr. Bertin entered the supply business in Paris with accounts for American manufacturers in 1920, and took charge of the Galena affairs in France and neighboring countries, later becoming managing director of the French subsidiary. He subsequently served as chairman of that company, which position he held until his election as president of the Galena Signal Oil Company. In addition he represented large American banking interests on foreign railroads and has been a member of the board of a number of large industrial concerns.

M. J. A. Bertin

A factory building of the **Central Railway Signal Company** at Hammond, Ind., was damaged by an explosion in which one person was killed on December 10.

The Coale-Fraser Lumber Company, Chicago, has opened an eastern sales office at 1213 Bessemer building, Pittsburgh, Pa., in charge of **W. B. Fraser,** a member of the firm.

The Electric Controller & Manufacturing Company, Cleveland, Ohio, has removed its Toronto office from the Traders Bank building to 415 Metropolitan building, Toronto, Ontario.

Charles C. Curry, of Curry & Company, 310 South Michigan boulevard, Chicago, has been appointed sole Chicago agent of **E. J. Brooks & Company, Inc.,** New York, for the sale of its twist lock and flag car seal.

The Griffin Wheel Company, Chicago, has purchased the **Standard Car Wheel Company,** Cleveland, Ohio, and the **Saint Bernard Manufacturing Company,** Cincinnati, Ohio, which it will operate as branch plants.

Henry C. Darby, formerly sales representative of the Kansas City Structural Steel Company, Kansas City, Mo., has been appointed sales representative of the **Inland Steel Company,** with headquarters in Kansas City.

The Western Machine Tool Works, Holland, Mich., has bought the entire assets of the **John Steptoe Shaper** business, Cincinnati, Ohio. The Steptoe shapers have been built since 1845 and the new owners will continue the manufacturing of the complete line of Steptoe shapers which are built from 14-in. to 24-in. sizes.

Wilfred S. Lowry has joined the staff of the **American Brown Boveri Electric Corporation** at its Camden, N. J., plant and has been assigned to the blower division as an application engineer. **J. M. Van Nieukerken** has joined the organization as a railroad project engineer, having formerly specialized in this class of work.

J. H. Ridge has been appointed branch manager of the Pittsburgh branch of the **Timken Roller Bearing Service & Sales Company,** with headquarters at Pittsburgh, Pa. **G. G. Weston** has been appointed branch manager of the Omaha branch, with headquarters at Omaha, Neb. **Paul Ackerman** has been appointed engineer of the service department, with headquarters at Canton, Ohio.

Trade Publications

CORROSION.—The Quigley Triple A protective coatings for preventing the corrosion of iron, steel, galvanized and plated surfaces are described in a 24-page booklet issued by the Quigley Furnace Specialties Company, Inc., 26 Cortlandt street, New York. These coatings also waterproof and protect surfaces of concrete, stone, brick, wood, etc.

WROUGHT STEEL WHEELS.—The specifications adopted by the American Railway Association and the American Society for Testing Materials are included with the data, tables and specifications pertaining to designs of wrought steel wheels, forged steel axles, and other circular sections, given in a 138-page booklet issued by the Carnegie Steel Company, Pittsburgh, Pa.

HYTEMPITE.—Some of the details of construction and maintenance of brick and tile work in power plants are dealt with in a 24-page, illustrated bulletin entitled, "Hytempite in the Power Plant," which is being issued by the Quigley Furnace Specialties Company, Inc., 26 Cortlandt street, New York. Emergency repairs and replacements that have been made permanent through the use of Hytempite are also described.

GASOLINE RAIL CARS.—The Edwards Model 20 gasoline rail car is described in the 20-page illustrated catalogue of the Edwards Railway Motor Car Company, Sanford, N. C. This car is designed for branch line passenger, mail and express service where traffic is fairly heavy, and is so constructed that an additional power truck for handling trailers, etc., could be put under the rear of the car should the necessity for additional power arise.

PNEUMATIC COLLECTING AND CONVEYING SYSTEMS.—The B. F. Sturtevant Company, Hyde Park, Boston, Mass., has issued catalogue No. 291 describing the advantages of pneumatic conveying systems, conveying of fibrous materials, and dust collectors for sand blast machines, grinding and polishing wheels, etc. Part 2 of the catalogue includes data covering the design and application of collecting systems, the engineering method and design used in dust conveying systems, size of connections for grinding, polishing wheels and woodworking machinery, and other miscellaneous tables and engineering data.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—Bids closed on December 14 for the construction of a one-story warehouse, 340 ft. by 40 ft., at Argentine, Kan.

ATLANTIC CITY.—This company has applied to the Interstate Commerce Commission for a certificate authorizing the construction of a branch from Cape May to Cape May point, N. J., 2.64 miles.

BALTIMORE & OHIO.—This company plans the construction of a new freight yard and engine terminal at Cincinnati, Ohio. An initial appropriation of $1,390,000 has been made for this project.

CANADIAN NATIONAL.—A contract has been awarded to the Canadian Bridge Company, Walkerville, Ont., for the construction of a bridge across the Athabasca river, 3.5 miles west of Dyke, Alta. The bridge will consist of six 100-ft. deck plate girder spans and abutments. Plans have been prepared for the construction of a new bridge over the La Seine river west of La Seine, Ont., as a part of the realignment work made necessary, over a distance of four miles near this point, by a water power development. The new single track bridge will be made up of one 150-ft. through truss span and two deck plate girders, 40 ft. and 30 ft. long, with substructure for double track.

CHESAPEAKE & OHIO.—This company will rebuild an arch and enlarge the Red Hill tunnell at Callaghan, Va., at a cost of $214,000.

CHICAGO, ROCK ISLAND & PACIFIC.—Bids were received until December 17, for the construction of a passenger station at Tonkawa, Okla., to cost about $20,000.

GREAT NORTHERN.—A contract has been awarded to the Barnett & Record Company, Duluth, Minn., for the construction of the concrete and steel substructure of the third section of ore dock No. 1 at Allouez, Wis. This portion of the project involves an expenditure of about $550,000.

LEHIGH VALLEY.—Plans have been prepared for the construction of approaches and a double track tunnel immediately south of the Musconetcong (N.J.) tunnel. Improvements are also contemplated at the East One Hundred and Forty-ninth street terminal, New York, including construction of a transfer bridge, slip, dockwork and dredging.

LOS ANGELES & SALT LAKE.—Construction of a sanitary sewer system to serve the Harbor district at Wilmington, Cal., and additional trackage and street improvements are contemplated at an estimated cost of $431,000.

LOUISVILLE & NASHVILLE.—This company is prepared for the construction of freight facilities at Mobile, Ala., at an approximate cost of $168,000. Included in this project are a freight house, 440 ft. by 40 ft., a transfer platform, 193 ft. by 12 ft., and an automobile platform, 150 ft. by 40 ft., each to be constructed of brick and concrete. A contract has been awarded for the construction of a roundhouse at Howell, Ind., with nineteen 110-ft. stalls. Including mechanical installations the brick and concrete structure will cost about $269,800. Contracts have been awarded for the construction of a passenger station at Opp, Ala., at a cost of $27,000, to the Opp Building & Supply Company and T. P. Winston.

MISSOURI PACIFIC.—The contract for the excavation and placing of the foundations of the new 22-story office building at St. Louis, Mo., has been awarded to the John Hill Construction Company, St. Louis.

NEW YORK CENTRAL.—This company contemplates the construction of a new passenger station at Youngstown, Ohio, three stories in height with dimensions of 150 ft. by 50 ft. A contract has been let for the construction of a through girder bridge to carry four main tracks over the Lincoln Highway at Rolling Prairie, Ind., the railroad's share of the cost of this project being $86,000. The projected separation of grades at South Bend, Ind., at a total cost of about $8,000,000, involves the construction of

eleven four track highway subways, new through and station tracks, a freight station and team tracks. Present executive authority has appropriated $1,225,000 for this work.

NEW YORK, NEW HAVEN & HARTFORD.—This road has authorized grading and track work by company forces at Cedar Hill, New Haven, to cost approximately $50,000.

PENNSYLVANIA.—A contract has been awarded to the Dunbar & Sullivan Dredging Company, Detroit, Mich., for dredging in dock No. 10 at Ashtabula, Ohio, estimated to cost $30,000.

PENNSYLVANIA.—Plans have been prepared for the relocation of the inbound station and the rearrangement of facilities of the American Railway Express Company at Polk street, Chicago, at a cost of $180,000. A contract has been let to the Ogle Construction Company, Chicago, for the construction of a 500-ton reinforced concrete automatic electric coaling station at East Rochester, Ohio.

READING.—This company contemplates the construction of a connection between its Lebanon Valley and Steelton branches at Harrisburg, Pa., at an approximate cost of $510,000. A number of bridges are involved including those planned at Cameron street, Paxton creek, Hemlock street and Sycamore street. Plans have been prepared for additional passenger, freight and express facilities at Pottstown, Pa., which with elimination of a grade crossing and construction of a fifth main track are expected to cost $1,480,000. Plans involving an expenditure of $280,000 have also been prepared for a change of alignment and replacement of the viaduct at Mainville, Pa. Improvements contemplated at Philadelphia, Pa., include elimination of grade crossings between Wissahickon Creek and Fountain street, Manayunk, at an estimated cost of $4,500,000, to be borne equally with the city of Philadelphia, and construction of a three-story warehouse at Twentieth and Hamilton streets to cost $220,000.

ST. LOUIS-SAN FRANCISCO.—This company has asked for bids for the construction of a brick combined freight and passenger station at Boynton, Okla., estimated to cost $15,000. Bids have also been asked for the construction of a 50-ton coaling station at Chauteau avenue, St. Louis, Mo., as an alternate bid following the original request for bids on a station of 100-tons capacity.

TEXAS, PANHANDLE & GULF.—The Interstate Commerce Commission has denied this company's petition for a reopening of the case in which the commission recently authorized the construction of over 200 miles of line in Texas by the Fort Worth & Denver South Plains and the Quanah, Acme & Pacific, but denied the application of the T., P. & G. for a certificate authorizing the construction of a line from Tucumcari, N. M., to Fort Worth, Tex.

TEXAS, PANHANDLE & GULF.—This company, which was recently denied a certificate authorizing the construction of a line from Tucumcari, N. M., to Fort Worth, Tex., has applied to the Interstate Commerce Commission for a rehearing and a postponement for 60 days of the commission's order which authorized the construction of lines in the Texas Panhandle district by subsidiaries of the Burlington and Frisco systems. The application states that its original application was apparently denied because of a belief on the part of the commission that its financial ability was not such as to make it certain that the proposed line would be promptly completed, but that it has now opened negotiations with certain trunk lines and believes they will result in the acquisition by one or more of such lines of such an interest in the proposed line as will assure the prompt commencement of construction and its completion within a reasonable time.

UNION PACIFIC.—The construction of an addition to the freight station at Aberdeen, Wash., 80 ft. by 40 ft., at a cost of $23,000 has been authorized. This station is operated jointly by the Union Pacific and the Chicago, Milwaukee & St. Paul.

THE BONES OF A PREHISTORIC ANIMAL, estimated to be 30,000 years old, have been unearthed near Ponca City, Okla., by contractors building a new line of the Chicago, Rock Island & Pacific into that city from Billings, Okla. The bones unearthed are about 5 ft. long and 12 in. in diameter. A tooth, 5 in. in diameter and 18 in. long, also was found. An effort is being made to find the remainder of the skeleton, the bones of which were unearthed while digging through a sandy hill.

Railway Financial News

ATLANTIC COAST LINE.—*Acquisition.*—This company has filed with the Interstate Commerce Commission a supplemental application for authority to acquire control of the Atlanta, Birmingham & Coast, the new company formed to take over the Atlanta, Birmingham & Atlantic. The commission, in authorizing the acquisition of control of the A. B. & A., by the new company withheld specific authority for the acquisition by the Atlantic Coast Line, until receipt of proof of the incorporation of the new company accompanied by a copy of its charter. The new company has since been incorporated.

Stock Increase Approved.—Stockholders at a special meeting held on December 13 approved the proposed increase in the capital stock amounting to $24,000,000 of which $13,756,500 will be issued in common stock for distribution at $100 a share to holders of preferred and common stock in the ratio of one share of the new for each five shares of the old stock. The increase authorized makes the total authorized capital stock $100,000,000, the total amount permitted in the company's charter.

BALTIMORE & OHIO.—*Extra Dividend.*—Directors have declared an extra dividend of 50 cents a share on the common in addition to the regular quarterly dividend of 1½ per cent both payable March 1 to stockholders of record February 15. The Baltimore & Ohio paid quarterly dividends of 1¼ per cent up to the dividend paid on December 1, 1926, when the rate was increased to 1½ per cent. It was stated that the extra dividend was declared so as to make the dividends declared in 1926 total 6 per cent. The actual dividends paid during 1926, however, will total 5¼ per cent.

Will Exercise Reading Rights.—It is reported that the Baltimore & Ohio will exercise its right to subscribe to 303,325 certificates of interest in the Philadelphia & Reading Coal & Iron Company which rights have been twice extended and now expire on January 1, 1927. By the terms of dissolution the Reading Company stockholders who take up their rights to subscribe to coal company certificates have until July 1,. 1927, to dispose of their Reading Company stock or their certificates of interest in the coal company and it is supposed that the Baltimore & Ohio will elect to keep the railroad stock.

BOSTON & MAINE.—*Dividends.*—The board of directors on December 14 declared an initial dividend of $2.33 on the new 7 per cent prior preference stock issued in connection with the reorganization plan and a full year's dividends on the first preferred stock as follows: Class A, $5.00; B, $8.00; C, $7.00; D, $10.00 and E, $4.50, all payable January 1 to stockholders of record on December 17. The dividend on the prior preference stock covers the four months since the stock was issued on September 1, 1926. The dividends on the first preferred stock cover the half year from July 1, 1926, to December 31, 1926, and also the last half of 1925. Dividends on this issue for the first half of 1926 were paid in July.

CHICAGO & NORTH WESTERN.—*New Director.*—W. Seward Webb has been elected a director of this company and of the Chicago, St. Paul, Minneapolis & Omaha succeeding W. K. Vanderbilt, resigned.

CHICAGO, MILWAUKEE & ST. PAUL.—*Bondholders Petition Supreme Court.*—The bondholders' defense committee of the Chicago, Milwaukee & St. Paul made formal application to the Supreme Court of the United States on December 13 for leave to file a petition of mandamus to compel the federal court at Chicago to allow an appeal from its order denying intervention on the part of the committee against the order directing sale of the road at foreclosure.

Name of New Company.—The bankers in charge of the reorganization have issued an announcement that the name of the new company will be the Chicago, Milwaukee, St. Paul & Pacific, instead of the Chicago, Milwaukee & Pacific as previously proposed. The announcement said:

The word St. Paul was dropped in the interest of brevity and because the road is generally known throughout its territory as

"the Milwaukee." However, various business associations have pointed out that there is a great sentimental attachment to the name "St. Paul" throughout the Northwest, and have urged that the name of the city be not dropped from the name of the new company. The reorganization managers have been glad to defer to that sentiment and, therefore, at some convenient time before the new road takes possession of the property, the name will be changed to Chicago, Milwaukee, St. Paul & Pacific Railroad Company.

NEW YORK, NEW HAVEN & HARTFORD.—*To Merge Central New England.*—It was reported on December 15 that the New Haven had purchased the last remaining outstanding share of stock of the Central New England and that accordingly plans will go forward to complete the consolidation of the two corporations authorized by the stockholders of both companies in 1921. The New Haven has controlled the Central New England by ownership of nearly all its capital stock.

PITTSBURGH & LAKE ERIE.—*Dividends.*—Directors have declared an extra dividend of $5.00 (10 per cent) in addition to the regular semi-annual dividend of $2.50 (5 per cent) on the $50.00 par value stock both payable February 1 to stockholders of record January 17. Dividends on this stock have not been less than 10 per cent in any year since 1892. This present extra payment is the first extra since August, 1916, when 20 per cent was paid. The New York Central controls the Pittsburgh & Lake Erie by ownership of a majority of its capital stock.

RUTLAND.—*Dividend.*—Directors on December 14 declared a dividend of $1.00 on the preferred stock, the first dividend since 1918. Dividends on this issue are 7 per cent cumulative but were discontinued in 1903. In 1906, 1907 and 1908 1½ per cent was paid and in 1916, 1917 and 1918, 2 per cent. Arrears on this issue at present total 301 per cent.

Average Price of Stocks and Bonds

	Dec. 14	Last Week	Last Year
Average price of 20 representative railway stocks	102.78	100.74	98.13
Average price of 20 representative railway bonds	97.21	96.90	94.91

Dividends Declared

Detroit, Hillsdale & Southwestern—2 per cent, payable January 5 to holders of record December 20.

Mohawk Valley.—$.50, quarterly, payable January 3 to holders of record December 20.

Morris & Essex.—2.12½ per cent, payable January 3 to holders of record December 9.

New York & Harlem.—Common and preferred, $2.50, payable January 3 to holders of record December 15.

New York, Lackawanna & Western.—1¼ per cent, quarterly, payable January 3 to holders of record December 13.

Pittsburgh, Fort Wayne & Chicago.—Common, 1¾ per cent, quarterly, payable January 1 to holders of record December 10. Preferred, 1¾ per cent, quarterly, payable January 4 to holders of record December 10.

Pittsburgh, McKeesport & Youghiogheny.—$1.50, quarterly, payable January 3 to holders of record December 15.

Renssalaer & Saratoga.—4 per cent, payable January 1 to holders of record December 16.

Rutland.—Preferred, $1.00, payable January 20 to holders of record December 30.

Virginian.—Common, $7.00, payable December 31 to holders of record December 21.

Valuation Reports

The Interstate Commerce Commisison has issued valuation reports stating the final value for rate-making purposes of the property owned and used for common carrier purposes, as of the respective valuation dates, as follows:

FINAL REPORTS		
Arcata & Mad River	$421,200	1917
Fredicksburg & Northern	367,815	1919
Fulton Chain	56,000	1917
Mackinac Transportation Company	629,163	1918
Marion	146,521	1918
Lowville & Beaver River	279,225	1918
Santa Fe Dock & Channel Company	775,000	1916
TENTATIVE REPORTS		
Miami Mineral Belt	$327,925	1919
Northern Pacific Terminal	6,572,612	1916
South Buffalo	1,699,330	1917
Zanesville & Western	2,945,000	1918

Railway Officers

Executive

T. W. Evans, assistant vice-president of the New York Central, with headquarters at New York, has been elected vice-president of the Indiana Harbor Belt and the Chicago River & Indiana, effective January 1, 1927, succeeding **George Hannauer,** recently elected president of the Boston & Maine. Mr. Evans was born on July 15, 1867, at Morris Run, Pa., and was educated in the common schools. He entered railway service on June 1, 1883, with the Fall Brook Railway (now a part of the New York Central), as a telegraph operator at Cedar Run, Pa. In December of the same year he was transferred to Wellsboro, Pa., and remained there until April, 1888, when he was appointed train dispatcher of the same road at Jersey Shore, Pa. In September, 1893, he entered the service of the Beech Creek (which became a part of the Pennsylvania division of the New York Central in 1899) in a similar capacity. In September, 1901, he was appointed trainmaster of the Beech Creek district of the Pennsylvania division of the New York Central, and in December, 1904, became chief trainmaster of the same division. From May, 1906, to October of the following year he was assistant superintendent of the same division. In October, 1907, he was appointed superintendent of the Rochester division, and in June, 1910, was transferred in the same capacity to the Buffalo division of the same road. He was promoted to general superintendent of the Western district in October, 1912, and in April, 1915, he was transferred as general superintendent of the Second district to Buffalo, N. Y. On June 1, 1916, Mr. Evans was promoted to assistant general manager of the lines East, at New York, and on April 1, 1920, was transferred to Syracuse, in the same capacity. On May 1, 1924, he was elected assistant vice-president, which position he was holding at the time of his recent election.

T. W. Evans

Financial, Legal and Accounting

C. R. Smith has been appointed assistant secretary of the National of Mexico, with headquarters at New York, succeeding **Bartolome Carbajal,** resigned.

J. D. Abbott has been appointed general claim agent of the Oregon Short Line, with headquarters at Salt Lake City, Utah, succeeding **L. E. Abbott,** retired. L. E. Abbott was born on April 12, 1868, at Farmington, Utah, and spent two years at the University of Utah. He entered railway service in January, 1903, with the Southern Pacific on the construction of the Lucin cut-off. In 1905 he became a claim adjuster on the Oregon Short Line and five years later he was appointed safety commissioner. He was promoted to general claim agent in 1914, a position he held until his retirement.

Operating

C. P. Cahill has been appointed trainmaster on the Colorado division of the Union Pacific, with headquarters at Denver, Colo.

P. L. Peffer, general yardmaster on the New York, Chicago & St. Louis, with headquarters at Conneaut, Ohio, has been promoted to terminal trainmaster at Buffalo, N. Y., succeeding **M. J. Nolan,** deceased.

C. H. Buchanan has been appointed trainmaster of the Third district of the Cincinnati, New Orleans & Texas Pacific (part of the Southern), with headquarters at Oakdale, Tenn., succeeding **J. R. Dearing,** who has been appointed chief dispatcher of the Alabama Great Southern (also a part of the Southern), with headquarters at Birmingham, Ala., succeeding Mr. Buchanan.

C. L. Harris, assistant to the chief of transportation of the Canadian National, with headquarters at Montreal, has been appointed superintendent of the Mornepayne division of the Northern Ontario district, with headquarters at Mornepayne, Ont., succeeding **J. J. Napier,** who has been transferred to the Capreol division, with headquarters at Capreol, Ont. Mr. Harris will be succeeded by **G. N. Good,** superintendent of the Capreol division.

H. P. Galbreath, superintendent of the Northern Kansas division of the Missouri Pacific with headquarters at Atchison, Kan., has been transferred to the Central division with headquarters at Van Buren, Ark., succeeding **R. H. Dwyer,** who has been granted a leave of absence because of ill health. **R. E. Cahill,** engineer of the Northern Kansas division with headquarters at Atchison, has been appointed acting superintendent of this division, succeeding Mr. Galbreath. **E. M. Bishop** has been appointed trainmaster of the Ferriday and Swartz districts of the Louisiana division, with headquarters at Monroe, La., succeeding **C. A. Forbes,** promoted.

Traffic

Max V. Beckstedt has been appointed assistant general freight agent of the Delaware & Hudson, with headquarters at Albany, N. Y.

W. D. Dimmitt, assistant foreign freight agent of the Norfolk & Western, with headquarters at New York, has been transferred to Norfolk, Va., succeeding **H. M. Mackan,** deceased. **W. C. Sawyer,** assistant foreign freight agent at Chicago, has succeeded Mr. Dimmitt at New York, and **E. N. Dudley,** chief clerk to the division freight agent at Winston-Salem, N. C., has been promoted to assistant foreign freight agent at Chicago.

C. J. Collins, general passenger agent of the Oregon-Washington Railroad & Navigation Company, a subsidiary of the Union Pacific, with headquarters at Portland, Ore., has been promoted to general passenger agent of the Union Pacific, with headquarters at Omaha, Neb., succeeding **Wilson H. Murray,** who will retire on January 1, 1927. **W. K. Cundiff,** assistant general passenger agent on the Union Pacific with headquarters at Denver, Colo., will succeed Mr. Collins. **L. E. Omer,** chief clerk in the general passenger office of the Union Pacific System at Portland, has been promoted to assistant general passenger agent with headquarters at Omaha. **J. S. McClure,** city passenger and ticket agent at Denver, has been promoted to assistant general passenger agent with headquarters at Denver, succeeding Mr. Cundiff. Mr. Murray was born on March 26, 1860, at Philadelphia, Pa., and attended Girard College in that city, graduating in 1878. He entered railway service on January 25, 1883, with the Chicago, Burlington & Quincy, where he remained until September 1, 1887, when he entered the employ of the Union Pacific. After occupying various clerical positions in the general passenger office he was appointed chief clerk in 1894. In February, 1907, he was promoted to assistant general passenger agent with headquarters at Omaha and in July, 1923, he was again promoted to general passenger agent with the same headquarters, the position he now occupies.

Purchases and Stores

Ralph L. Tindal, chief clerk to the vice-president and general manager of the New York, Chicago & St. Louis, who has been promoted to purchasing agent, was born on July 15, 1889, at Ogdensburg, N. Y. After attending the Ogdensburg public schools and the Ogdensburg Free Academy he entered railway service on February 1, 1912, in the mechanical department of the Nickel Plate at Cleveland, Ohio. He served for a time as chief clerk to the master car builder and on January 1, 1919, he was appointed chief clerk to the superintendent of motive power. He remained here until September 1, 1923, when he became chief clerk to the vice-president and general manager, a position he held at the time of his promotion to purchasing agent on December 1.

Wilfrid P. Dittoe, who retired on December 1 as purchasing agent of the New York, Chicago & St. Louis and the Lake Erie & Western with headquarters at Cleveland, Ohio, 11 months after reaching the age of 70, the time provided for retirement under the pension rules of the Nickel Plate, was born on December 25, 1855. He spent 27 years as purchasing agent of this railroad, with a total period of 45 years in the company's service. Mr. Dittoe entered railway service in 1881 as a draftsman in the office of the chief engineer of the Nickel Plate. After several years in this capacity he was promoted successively to inspector and engineer. On September 12, 1899, he was again promoted to purchasing agent, with headquarters at Cleveland, and in July, 1922, his jurisdiction was increased to include the Lake Erie & Western, a position he held at the time of his retirement.

Wilfrid P. Dittoe

Special

Dr. James C. Zan has been appointed chief surgeon of the Spokane, Portland & Seattle, with headquarters at Portland, Ore., succeeding **Dr. E. B. Daniel,** resigned.

L. A. Dalton has been appointed agriculturist of the Delaware, Lackawanna & Western, with headquarters at Binghamton, N. Y., succeeding **A. S. Merchant,** deceased.

H. W. Brockman has been appointed chief of police of the New York Central, lines West of Buffalo, succeeding **George A. Collins,** deceased. Mr. Brockman entered the service of the Lake Shore & Michigan Southern (now a part of the New York Central) in January, 1905, as a patrolman, serving in various positions in the police organization until his appointment as inspector in 1917, which position he held until his recent promotion to chief of police.

Obituary

A. H. Powell, superintendent of shops of the Western Pacific, who died on November 28 at Sacramento, Cal., was born in West Virginia. One of his earliest positions in a railroad mechanical department was as master mechanic on the Chicago & Eastern Illinois at Villa Grove, Ill., where he remained until 1904 when he became master mechanic on the Cincinnati, Hamilton & Dayton at Ivorydale, Ohio. In 1907 he was appointed assistant master mechanic on the Denver & Rio Grande at Pueblo, Colo., and in the following year he was promoted to master mechanic on the Colorado Midland, the Denver & Rio Grande and the Rio Grande Western, with headquarters at Grand Junction, Colo. He was appointed master mechanic on the Western Pacific in 1910 and in 1915 he was promoted to general master mechanic. Mr. Powell was promoted to superintendent of shops, with headquarters at the Jeffrey shops, Sacramento, Cal., on November 1, 1921, holding this position until the time of his death.